

No. 92975-1

**COURT OF APPEALS, DIVISION TWO
OF THE STATE OF WASHINGTON**

**In re the Personal Restraint of Heidi Charlene Fero,
Petitioner.**

Opening Brief in Support of Personal Restraint Petition

J. Christopher Baird
WSBA No. 38944
JCBaird@perkinscoie.com
Margaret C. Hupp
WSBA No. 43295
MHupp@perkinscoie.com

PERKINS COIE LLP
1201 Third Avenue, Suite 4900
Seattle, WA 98101-3099
Telephone: 206.359.8000
Facsimile: 206.359.9000

M. Fernanda Torres
WSBA No. 34587
ftorres@uw.edu

Innocence Project Northwest
University of Washington School of Law
PO Box 85110
Seattle, WA 98145-1110
Telephone: 206.543.5780

Attorneys for Petitioner Heidi Charlene Fero

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I. ISSUE PRESENTED

Whether Heidi Fero is entitled to a new trial under RAP 16.4 because new expert testimony, based on new medical research about the timing and causes of shaken baby syndrome, is “newly discovered evidence” that undermines Ms. Fero’s conviction?

II. INTRODUCTION

Recent court decisions have recognized a new, significant, and legitimate debate about the causes and timing of what was once known as “shaken baby syndrome.”¹ As one court described it,

a significant and legitimate debate in the medical community has developed in the past ten years over whether infants can be fatally injured through shaking alone, whether an infant may suffer head trauma and yet experience a significant lucid interval prior to death, and whether other causes may mimic the symptoms traditionally viewed as indicating shaken baby or shaken impact syndrome.²

This debate arose because of significant advances in medical research regarding infant head trauma. As explained in the accompanying declarations from renowned experts Dr. Patrick Barnes and Dr. Janice

¹See, e.g., *State v. Edmunds*, 308 Wis. 2d 374, 746 N.W.2d 590, 596 (Wis. Ct. App. 2008).

²*Edmunds*, 746 N.W.2d at 596.

Ophoven, this research supports Heidi Fero's personal restraint petition on the basis of newly discovered evidence.

In 2003, a jury found that Ms. Fero assaulted 15-month-old Brynn Ackley. Nobody saw Ms. Fero abuse Brynn, and Ms. Fero has consistently maintained her innocence. Without eye witness testimony, a confession, or direct evidence of any kind, the State relied on the testimony of several doctors to prove its case against Ms. Fero. In fact, the conviction rested almost exclusively on now-refuted medical evidence regarding shaken baby syndrome.

The State's experts offered two primary opinions at trial, both of which were based on theories that the medical community has since abandoned. First, they opined that Brynn would have lost consciousness almost immediately after being shaken. Because Ms. Fero was the only adult present when Brynn lost consciousness, the State argued that Ms. Fero was the perpetrator. Second, they opined that injuries like Brynn's are only caused by either a major trauma, such as a car crash or a fall from a multistory building, or child abuse by violent shaking. Because Brynn had not been in a car crash or fallen from a building, the doctors reasoned that an adult must have violently shook Brynn.

New evidence completely undermines both of these conclusions. First, new medical research shows that infants that have injuries like Brynn's can, and often do, remain lucid for up to 72 hours after sustaining trauma. This research refutes the State's theory that Brynn must have been shaken while she was with Ms. Fero. Second, new medical research shows that it is not possible to cause injuries like Brynn's by shaking, and that many conditions mimic the symptoms that were once thought to indicate of shaken baby syndrome. These so-called "mimics" include low-impact events, such as short falls, as well as several medical conditions. This new evidence refutes the State's theory that Ms. Fero must have shaken Brynn.

Ms. Fero is innocent. She has served almost all of her prison sentence, waiting for the medical community's understanding of shaken baby syndrome to evolve. The medical profession has now abandoned the two theories that supported Ms. Fero's conviction. New medical evidence raises substantial doubt about whether a crime occurred at all, let alone whether Ms. Fero committed it. Because this new evidence, which was unavailable at the time of trial and only recently discovered, would change the result of the trial, she is entitled to a new trial under RAP 16.4.

III. STATEMENT OF THE CASE

A. New Medical Evidence

On January 7, 2002, Brynn arrived at the hospital with cerebral edema (brain swelling), subdural hemorrhages (brain bruising or bleeding) and retinal hemorrhages (bruising or bleeding in the retina), as well as other injuries. At the time of Ms. Fero's trial, many doctors believed that infants with these three symptoms—known as the “triad”—would have lost consciousness almost immediately after sustaining the trauma that lead to these injuries. They also believed that these symptoms only appeared in two situations: (1) after being violently shaken; or (2) after major trauma, such as a car crash. If an infant had not been in a car crash or fallen from a great height, many doctors assumed that infants with the triad of symptoms had been violently shaken. Relying on then-current medical beliefs, the State's experts testified that an adult must have violently shaken Brynn shortly before she arrived at the hospital.

New medical research shows that these beliefs were wrong. Dr. Patrick Barnes and Dr. Janice Ophoven have provided sworn declarations, and are prepared to testify, about how new research creates reasonable doubt about Ms. Fero's guilt. Doctors now know that infants suffering from the triad, like Brynn, can be lucid for up to three days after the event that causes the triad. This newly discovered and now well-

documented prevalence of so-called “lucid intervals” leads Dr. Barnes and Dr. Ophoven to conclude that it is impossible to determine that Brynn’s injuries occurred while in Ms. Fero’s care. Doctors also now know that a fall from a couch or a chair can lead to the exact same symptoms that were once thought diagnostic of shaken baby syndrome. That light trauma and other medical conditions can mimic the symptoms of shaken baby syndrome leads Dr. Barnes and Dr. Ophoven to conclude that it is impossible to tell what caused Brynn’s injuries. The declarations of Dr. Barnes and Dr. Ophoven are summarized below.

1. Evidence of Dr. Patrick Barnes.

Dr. Barnes is a Professor of Radiology at Stanford Medical Center and the Chief of Pediatric Neuroradiology and Medical Director of the MRI/CT Center at Lucile Salter Packard Children’s Hospital.³ Dr. Barnes is intimately familiar with the medical research regarding traumatic head injuries in general, and lucid intervals and mimics of shaken baby syndrome in particular.⁴ He describes research conducted after Ms. Fero’s trial that shows children can experience a lucid interval for up to 72 hours, and perhaps longer, after suffering trauma.⁵ In light of this new medical

³Declaration of Dr. Patrick Barnes (hereinafter “Barnes Decl.”) ¶ 1.

⁴*Id.* ¶¶ 4-7.

⁵*Id.* ¶¶ 6, 46-48.

research, the testimony of the State's experts that Brynn would have lost consciousness "immediately" is not scientifically valid.⁶ It is impossible to tell from the medical record when Brynn suffered her injuries.⁷

Dr. Barnes also explains how research conducted after Ms. Fero's trial identified several conditions that could have caused the triad.⁸ These so-called "mimics" of shaken baby syndrome include: (1) hypoxia-ischemia, or lack of oxygen to the brain; (2) bleeding or clotting disorders; (3) infection; (4) metabolic or tissue diseases; (5) light trauma, such as a fall from a chair; and (6) major trauma, such as a car crash.⁹ Recent research has also cast significant doubt on whether it is possible to cause the triad by shaking a child.¹⁰ Although shaking accompanied by one or more blows to the head may produce the triad in some situations, recent research shows that shaking alone does not.¹¹

Dr. Barnes describes how the recent research and his considerable experience interpreting Computed Tomography ("CT") images make it

⁶*Id.* ¶¶ 49-61.

⁷*Id.*

⁸*Id.* ¶¶ 35-45.

⁹*Id.* ¶ 43.

¹⁰*Id.* ¶¶ 14-34.

¹¹*Id.*

impossible to determine the cause of Brynn’s head injuries.¹² It is not possible to distinguish among shaken baby syndrome mimics using CT scans.¹³ Although it is possible, using newer imaging techniques like Magnetic Resonance Imaging (“MRI”), to distinguish among shaken baby syndrome mimics in some situations, MRI scans of Brynn’s injuries are not available.¹⁴

Dr. Barnes concludes that, in light of the new research, the opinions of the State’s experts that Brynn’s injuries could only have been caused by either major trauma or child abuse are not scientifically valid.¹⁵

2. Evidence of Dr. Janice Ophoven.

Dr. Janice Ophoven is a renowned pediatric forensic pathologist with nearly 40 years of clinical experience.¹⁶ Her declaration explains that new medical research has identified several potential causes of the triad, including minor falls.¹⁷ In light of this new research, the testimony of the

¹²*Id.* ¶¶ 49-57.

¹³*Id.* ¶¶ 31-33.

¹⁴*Id.* ¶¶ 49-57.

¹⁵*Id.* ¶¶ 58-62.

¹⁶Declaration of Dr. Janice Ophoven (hereinafter “Ophoven Decl.”) ¶ 1.

¹⁷*Id.* ¶¶ 6-17.

State's experts that Brynn's injuries could only have been caused by either major trauma or child abuse is not scientifically valid.¹⁸

Dr. Ophoven explains that the exact cause of Brynn's injuries cannot be determined based on the medical record because many of the potential causes of the triad were unknown in 2002, and the doctors who treated Brynn did not conduct a differential diagnosis.¹⁹ Although it is unlikely that Brynn suffered from a metabolic or tissue disorder, minor trauma, major trauma, and hypoxia cannot be ruled out as causes for her head injuries.²⁰

Dr. Ophoven also explains that, due to the advanced state of Brynn's brain swelling when she arrived at the hospital, it is extremely unlikely that Brynn was injured just before Ms. Fero called 911.²¹ Based on the new evidence regarding lucid intervals and the mechanisms and timing of the development of cerebral edema (brain swelling), Dr. Ophoven concludes that Brynn was injured at least 12 hours before the

¹⁸*Id.* ¶ 24.

¹⁹*Id.* ¶¶ 31-33.

²⁰*Id.* ¶¶ 31-33.

²¹*Id.* ¶¶ 22-27.

911 call, which would have been before Brynn arrived at Ms. Fero's house.²²

B. Ms. Fero's Trial

There is little doubt that something extremely serious happened to Brynn sometime before she arrived at the hospital. At trial, both sides believed, based on then-current medical knowledge, that Brynn was injured a short time before Ms. Fero called 911 at approximately 10 p.m. on January 7, 2002. Ms. Fero and the State, however, fundamentally disagreed about who, or what, caused Brynn's injuries. Ms. Fero testified that Kaed, Brynn's older brother, jumped onto Brynn and slammed her head into a wall several hours before the 911 call.²³ The State argued that Ms. Fero shook Brynn shortly before Ms. Fero called 911.²⁴

1. Sequence of Events

In the evening on January 7, Ms. Fero babysat two children: 15-month-old Brynn Ackley and Brynn's four-and-a-half-year-old half-brother, Kaed Franck.²⁵ Ms. Fero's children, one-year-old Deric and five-

²² *Id.* ¶ 27.

²³ V-A Report of Proceedings (RP) at 80-84 (Mar. 17, 2003).

²⁴ V-B RP at 148 (Mar. 17, 2003) (State's closing argument) ("And we know from the medical testimony that when you're shaken that hard, you're going to immediately go unconscious. And that's exactly what happened.").

²⁵ 1 RP at 117-18; 148-49 (Mar. 11, 2003).

year-old Rachel, were also at home.²⁶ Ms. Fero knew Brynn's parents, Brea Franck and Jason Ackley, through her now-husband, Dustin Goodwin.²⁷ Mr. Goodwin and Mr. Ackley worked together, and Ms. Fero occasionally watched Brynn and Kaed while Ms. Franck and Mr. Ackley were at work, though Ms. Fero had not watched Brynn or Kaed for about two weeks.²⁸

At about 2 p.m., Ms. Franck dropped Brynn and Kaed off at Ms. Fero's home.²⁹ Ms. Fero was still at work, but Mr. Goodwin was home.³⁰ He testified that Ms. Franck carried Brynn into the house in her car seat, which was unusual.³¹ Mr. Goodwin took Brynn out of the car seat and sat her in a rocking chair.³² Deric tried to play with Brynn, but she cried whenever Deric touched Brynn's legs.³³ Ms. Fero returned home about an hour later, and Mr. Goodwin left for work.³⁴

²⁶V-A RP at 74 (Mar. 17, 2003).

²⁷1 RP at 116 (Mar. 11, 2003).

²⁸V-A RP at 69-70 (Mar. 17, 2003).

²⁹1 RP at 152 (Mar. 11, 2003).

³⁰1 RP at 154 (Mar. 12, 2003).

³¹1 RP at 154-55 (Mar. 12, 2003).

³²1 RP at 156 (Mar. 12, 2003).

³³1 RP at 156-157 (Mar. 12, 2003).

³⁴1 RP at 157-59 (Mar. 12, 2003).

Ms. Fero described Brynn as being quiet and distant, which was not normal, and that Brynn did not walk around like she normally did.³⁵ Instead, she sat wherever Ms. Fero put her.³⁶ Ms. Fero gave Brynn a bath after dinner and saw several bruises on Brynn's body, including a large one on her lower abdomen.³⁷

After the bath, Ms. Fero put Brynn in a playpen downstairs while she bathed Deric upstairs.³⁸ While Ms. Fero was upstairs, Kaed jumped into Brynn's playpen and banged Brynn's head into the wall.³⁹ Ms. Fero did not see the incident, but Rachel did.⁴⁰ Rachel ran upstairs and told Ms. Fero that Kaed was hurting Brynn.⁴¹ Ms. Fero took Deric out of the bathtub and rushed downstairs.⁴² By then, Kaed was outside of Brynn's playpen and Brynn appeared to be fine.⁴³

³⁵V-A RP at 75 (Mar. 17, 2003).

³⁶V-A RP at 75 (Mar. 17, 2003).

³⁷V-A RP at 76 (Mar. 17, 2003).

³⁸V-A RP at 77 (Mar. 17, 2003).

³⁹V-A RP at 80-82 (Mar. 17, 2003); 1 RP at 40-41 (Mar. 10, 2003).

⁴⁰V-A RP at 80-81 (Mar. 17, 2003).

⁴¹V-A RP at 80 (Mar. 17, 2003).

⁴²V-A RP at 80 (Mar. 17, 2003).

⁴³V-A RP at 81 (Mar. 17, 2003).

Ms. Fero went back upstairs to finish Deric's bath.⁴⁴ A few minutes later, Rachel came back upstairs and told Ms. Fero that Kaed was hurting Brynn again.⁴⁵ When Ms. Fero went back downstairs, she saw Kaed jumping out of Brynn's playpen.⁴⁶ Ms. Fero saw that Brynn was on her knees and "shaking" or "trembling" and that she had a little blood coming out of her mouth.⁴⁷ Brynn was crying, but in a strange, almost silent way.⁴⁸ She "was shaking and gripping at [Ms. Fero], clenching and just--and [Ms. Fero] was holding [Brynn] to [Ms. Fero], because [Brynn] was just shaking so bad."⁴⁹

Ms. Fero took Brynn to the rocking chair and comforted her.⁵⁰ After Brynn fell asleep, Ms. Fero laid Brynn on the couch and called Mr. Ackley.⁵¹ Mr. Ackley testified that he spoke with Ms. Fero at around 7:45 that evening.⁵² During that call, Ms. Fero said Kaed had been hurting Brynn and that Brynn "couldn't walk on a leg" and that Brynn's "left leg

⁴⁴V-A RP at 81 (Mar. 17, 2003).

⁴⁵V-A RP at 81-82 (Mar. 17, 2003).

⁴⁶V-A RP at 82 (Mar. 17, 2003).

⁴⁷V-A RP at 82 (Mar. 17, 2003).

⁴⁸V-A RP at 83 (Mar. 17, 2003).

⁴⁹V-A RP at 83 (Mar. 17, 2003).

⁵⁰V-A RP at 84 (Mar. 17, 2003).

⁵¹V-A RP at 84-85 (Mar. 17, 2003); 1 RP at 118-19 (Mar. 11, 2003).

⁵²1 RP at 118 (Mar. 11, 2003).

was like she could not walk on it.”⁵³ Ms. Fero wanted to know how she should discipline Kaed.⁵⁴

Mr. Ackley testified that Kaed frequently hurt his half-sister, bruising her legs and her side.⁵⁵ Mr. Ackley had also seen Kaed knock Brynn down and pinch her on multiple occasions.⁵⁶ Mr. Ackley believed that Kaed’s aggression was getting worse.⁵⁷ In fact, Ms. Franck and Mr. Ackley sometimes argued about where Brynn’s bruises came from.⁵⁸

Mr. Ackley told Ms. Fero to lock Kaed in a separate room as discipline, but Ms. Fero eventually allowed Kaed to watch a video with Rachel.⁵⁹ While Kaed and Rachel watched the video, Brynn slept on the couch and Ms. Fero cleaned the house, occasionally checking on the children.⁶⁰ Just before 10 p.m., Ms. Fero noticed that Brynn’s eyes were open but that she was not moving.⁶¹ Brynn was unresponsive.⁶² Ms. Fero

⁵³1 RP at 118-19, 133-34 (Mar. 11, 2003).

⁵⁴1 RP at 119 (Mar. 11, 2003).

⁵⁵1 RP at 127-30 (Mar. 11, 2003).

⁵⁶1 RP at 127-30 (Mar. 11, 2003).

⁵⁷1 RP at 130 (Mar. 11, 2003).

⁵⁸1 RP at 163 (Mar. 11, 2003).

⁵⁹1 RP at 134 (Mar. 11, 2003); V-A RP at 86-88 (Mar. 17, 2003).

⁶⁰V-A RP at 88 (Mar. 17, 2003).

⁶¹V-A RP at 88-89 (Mar. 17, 2003).

⁶²V-A RP at 89 (Mar. 17, 2003).

attempted to revive Brynn by patting her face, gently jostling her, and splashing water on her face.⁶³ Ms. Fero called her mother, who had medical training, to ask what to do.⁶⁴ Her mother told Ms. Fero to call 911, and Ms. Fero immediately did so.⁶⁵

Paramedics arrived within minutes.⁶⁶ They found Brynn unconscious and saw bruises on several parts of her body.⁶⁷ At 10:10 p.m., they transported Brynn to Southwest Medical Center in Vancouver.⁶⁸

At Southwest, a CT scan showed that Brynn had subdural hemorrhaging and cerebral edema.⁶⁹ Brynn was transferred to the trauma center at Legacy Emanuel Medical Center in Portland, Oregon.⁷⁰ After arriving at Legacy Emanuel, Dr. Goodman observed hemorrhages in both Brynn's eyes, a condition known as bilateral retinal hemorrhages.⁷¹ The

⁶³V-A RP at 89 (Mar. 17, 2003).

⁶⁴V-A RP at 90 (Mar. 17, 2003).

⁶⁵V-A RP at 90 (Mar. 17, 2003).

⁶⁶1 RP at 37-38 (Mar. 10, 2003).

⁶⁷1 RP at 39-41 (Mar. 10, 2003); 1 RP at 40-41 (Mar. 11, 2003).

⁶⁸1 RP at 21 (Mar. 11, 2003).

⁶⁹2 RP at 59-60 (Mar. 12, 2003).

⁷⁰2 RP at 61 (Mar. 12, 2003).

⁷¹1 RP at 58-62 (Mar. 13, 2003).

doctors at Legacy Emanuel also noted that Brynn's left leg was fractured, a condition that the paramedics and the doctors at Southwest had missed.⁷²

2. The State's Theories About Brynn's Injuries.

The State did not offer any eyewitness testimony to counter the defense testimony that Kaed hurt Brynn. Instead, the State laid out several unsubstantiated ideas about how and why Ms. Fero could have injured Brynn. In one version, the State said that Ms. Fero swung Brynn into a wall.⁷³ The State argued that Brynn then cried for hours, leading Ms. Fero to break down and violently shake Brynn to stop the crying.⁷⁴

In another version, the State argued that Ms. Fero must have "lost it" while giving Brynn a bath, causing the bruising that Ms. Fero had reported to Mr. Ackley.⁷⁵ The State argued that "Bryn[n]'s maybe not paying attention to [Ms. Fero], not cooperating" during the bath, leading Ms. Fero to injure Brynn.⁷⁶

⁷²1 RP at 20-21 (Mar. 11, 2003).

⁷³V-B RP at 154 (Mar. 17, 2003).

⁷⁴V-B RP at 160, 162-63 (Mar. 17, 2003).

⁷⁵V-B RP at 158 (Mar. 17, 2003).

⁷⁶V-B RP at 158 (Mar. 17, 2003).

In a third version, the State argued that Brynn may have cried for hours, and that Ms. Fero may have shaken Brynn by the face to stop her.⁷⁷ Beyond conjecture that Ms. Fero “lost it,” the State never offered any explanation for why Ms. Fero, who had no history of violence—let alone violence against young children—assaulted Brynn.

However, when police interviewed Rachel and Kaed, neither reported that Brynn cried for hours or that Ms. Fero violently shook Brynn, broke Brynn’s leg, or grabbed Brynn’s face.⁷⁸ In fact, during Kaed’s first interview with Detective Steve Norton, Kaed told Detective Norton that he had hurt Brynn “when Brynn was not breathing.”⁷⁹

3. Medical Evidence Offered in Support of State’s Theories.

Because there was no direct evidence that Ms. Fero abused Brynn, the State supported its arguments with medical testimony. During trial, the State called six doctors who collectively testified that (1) Brynn must have been shaken and (2) the shaking must have occurred a short time

⁷⁷Compare V-B RP at 160 (Mar. 17, 2003), with 2 RP at 233-34 (Mar. 11, 2003) (Dr. Lukschu testifying that the bruises could have been caused by separate blows to the face or by someone grabbing Brynn’s face).

⁷⁸2 RP at 211-17 (Mar. 12, 2003); V-A RP at 57-61 (Mar. 17, 2003).

⁷⁹2 RP at 212 (Mar. 12, 2003).

before Ms. Fero called 911.⁸⁰ The testimony of these doctors is summarized below.

Dr. Daniel Gorecki, an emergency room physician at Southwest Washington Medical Center, testified that a CT scan of Brynn's brain showed that Brynn had a subdural hemorrhage and cerebral edema.⁸¹ Dr. Gorecki opined that Brynn's subdural hemorrhage was caused by a repetitive motion, such as shaking.⁸² Moreover, he opined that Kaed could not have caused Brynn's repetitive injuries because children "don't continue their behavior unabated."⁸³ Finally, he testified that Brynn could have immediately lost consciousness after suffering her head injuries, or that she may have remained conscious for 5 to 10 minutes.⁸⁴

Dr. James Ockner, a radiologist at Southwest Washington Medical Center, testified that a CT scan showed that Brynn had a subdural hemorrhage.⁸⁵ He opined that this hemorrhage was caused by ruptured

⁸⁰See also *State v. Fero*, 125 Wn. App. 84, 95-96, 104 P.3d 49 (2005).

⁸¹1 RP at 59, 64 (Mar. 12, 2003).

⁸²1 RP at 60, 64 (Mar. 12, 2003).

⁸³1 RP at 64 (Mar. 12, 2003).

⁸⁴1 RP at 74 (Mar. 12, 2003) (“[W]ell, it could take 5 or 10 minutes, okay, before something would appear. So there would be maybe a 10-minute period, roughly, of the child may be okay, crying, the swelling progresses, so it's -- it's hard to nail down the time. In my -- for me, I can't give you a scientific time based on, you know, what was found. I can just tell you that it is possible that there was some episode where the child was not unconscious.”).

⁸⁵1 RP at 83-84 (Mar. 12, 2003).

bridging veins between Brynn's brain and her dura, the outermost membrane of the covering of the brain.⁸⁶ Dr. Ockner testified that Brynn's head injuries, including the subdural hemorrhage, were the result of non-accidental shaking because there was no evidence of impact to Brynn's skull, such as a skull fracture or "goose eggs."⁸⁷ Dr. Ockner also opined that Brynn's injuries could not have occurred from something like "falling out of bed."⁸⁸ In fact, in response to questions about the force required to cause Brynn's injuries, Dr. Ockner responded as follows:

All I can say is that it's a severe type of injury, something that you would expect to see out of a car accident, a severe blow to the head with an implement or – or a fall from a great height or something like that. This would be a fall of something more than a counter top or something like that.⁸⁹

Finally, Dr. Ockner testified that a severe shaking injury causes an immediate loss of consciousness.⁹⁰

Dr. Michael Lukshu, a pediatrician at Legacy Emanuel Hospital, testified that shaken baby syndrome is an "inflicted injury," and that

⁸⁶1 RP at 84 (Mar. 12, 2003).

⁸⁷1 RP at 90-92 (Mar. 12, 2003).

⁸⁸1 RP at 97 (Mar. 12, 2003).

⁸⁹1 RP at 96 (Mar. 12, 2003).

⁹⁰1 RP at 97 (Mar. 12, 2003) ("With – if the blow is severe enough that cause [*sic*] diffuse axonal injury typically – or a shaking injury, typically a patient loses consciousness right away.").

Brynn's injuries were "the result of severe shaking."⁹¹ He opined that Brynn's injuries were so severe that she would have "immediately" lost consciousness.⁹² He testified that "shaking alone can cause the severe injuries" characteristic of shaken baby syndrome.⁹³ Moreover, he testified that bilateral retinal hemorrhages are only present in infants who have suffered shaken baby syndrome.⁹⁴ He testified that Kaed could not have generated the force required to cause Brynn's injuries.⁹⁵

Dr. William Bennett, a pediatric radiologist at Legacy Emanuel Hospital, testified about Brynn's fractured leg and her head injuries. He testified that Brynn's leg fracture was between one hour and four days old and that Brynn would not have been able to walk with the fracture.⁹⁶ He also opined that a young child like Kaed would not be able to generate enough force to cause that injury.⁹⁷ On cross-examination, he conceded

⁹¹2 RP at 180-81, 191 (Mar. 11, 2003).

⁹²2 RP at 195 (Mar. 11, 2003) ("With this severe injury, I doubt if she had cried at all. She would have been almost immediately unconscious and not doing anything [*sic*] initially.").

⁹³2 RP at 180 (Mar. 11, 2003).

⁹⁴2 RP at 184, 197 (Mar. 11, 2003).

⁹⁵2 RP at 190, 196, 198-99 (Mar. 11, 2003).

⁹⁶RP at 15-16 (Mar. 13, 2003).

⁹⁷RP at 16-17 (Mar. 13, 2003).

that the fracture was consistent with “toddler fractures,” accidental injuries that sometimes occur when toddlers fall and twist their legs.⁹⁸

Dr. Bennett testified that, based on CT scans of Brynn’s brain, Brynn sustained these injuries between 7 p.m. and 9 p.m. on the night of January 7, 2002.⁹⁹ He opined that the force required to cause Brynn’s head injuries was “equivalent to being ejected from a motor vehicle and smashing her face into a bank.”¹⁰⁰ Moreover, he testified that, if the injury had been caused by repeated blows to the face (such as by Kaed hitting Brynn with a toy cane or hammer), the blows would have destroyed all of Brynn’s facial bones.¹⁰¹ Lastly, he testified that a four-and-a-half-year-old could not have caused Brynn’s head injuries.¹⁰²

Dr. Kent Grewe, a neurosurgeon at Legacy Emanuel who practiced mainly on adults, testified that Brynn would not have been lucid after she suffered her head injuries.¹⁰³ He also testified that if the injury had been

⁹⁸RP at 26 (Mar. 13, 2003).

⁹⁹RP at 28 (Mar. 13, 2003).

¹⁰⁰RP at 30 (Mar. 13, 2003).

¹⁰¹RP at 34 (Mar. 13, 2003) (“The amount of force necessary to produce a brain injury of this magnitude by repeated blows to the face would destroy the face, there wouldn’t be just bruises and swelling, there would be destruction of all the bones of the face and everything else.”).

¹⁰²RP at 35 (Mar. 13, 2003).

¹⁰³RP at 36, 43 (Mar. 13, 2003).

caused by a blow to the head, there would have been a skull fracture.¹⁰⁴

Finally, he testified that Kaed could not have caused Brynn's head injuries by hitting her in the head with a toy or by pushing her head into a wall.¹⁰⁵

Lastly, Dr. Shawn Goodman, a pediatric ophthalmologist, testified that he observed hemorrhages in both of Brynn's eyes and that the hemorrhages were consistent with non-accidental trauma.¹⁰⁶ However, he conceded that similar hemorrhages had been observed in other situations, including accidental trauma.¹⁰⁷

Based on this medical evidence, the State argued that Ms. Fero shook Brynn nearly to death.¹⁰⁸ Ms. Fero did not call any medical experts to testify on her behalf. Instead, her attorney challenged the State's experts with medical evidence that shaking alone cannot, without an accompanying head impact, cause injuries like Brynn's.¹⁰⁹ Ms. Fero did not offer medical evidence on the prevalence of lucid intervals or the low

¹⁰⁴RP at 46 (Mar. 13, 2003).

¹⁰⁵RP at 50 (Mar. 13, 2003).

¹⁰⁶RP at 58, 61-63 (Mar. 13, 2003).

¹⁰⁷RP at 67-71 (Mar. 13, 2003).

¹⁰⁸RP at 176 (Mar. 17, 2003) ("And [Dr. Lukschu] says there's only one explanation. That [Brynn's injury] was inflicted trauma by an adult or person larger than four and a half years old.").

¹⁰⁹*See, e.g.*, 2 RP at 215-16 (Mar. 11 2003).

force required to cause head injuries like Brynn's. Such evidence did not exist at the time of trial.¹¹⁰

4. Non-Medical Evidence Offered in Support of State's Hypotheses

The State offered two types of non-medical evidence against Ms. Fero: (1) testimony regarding arguably inconsistent statements by Ms. Fero; and (2) testimony that Ms. Fero acted in a manner inconsistent with innocence.

One inconsistent statement concerned whether Ms. Fero gave Brynn a bath.¹¹¹ Detective Steve Norton recalled that Ms. Fero told him that she had not given Brynn a bath.¹¹² At trial, however, Ms. Fero testified that she gave Brynn a bath around 6:30 p.m. and, at that time, Ms. Fero discovered a bruise on Brynn's abdomen.¹¹³ Another inconsistency was the amount of time that elapsed between when Ms. Fero laid Brynn on the couch and when she noticed that Brynn was unresponsive. Detective Nelson recalled that Ms. Fero told him that she noticed something was wrong with Brynn about five minutes after

¹¹⁰*See infra* at IV.B.

¹¹¹V-B RP at 158 (Mar. 17, 2003).

¹¹²2 RP at 193 (Mar. 12, 2003).

¹¹³V-A RP at 76-77 (Mar. 12, 2003).

Ms. Fero put Brynn on the couch.¹¹⁴ Ms. Fero provided a written statement to Officer Telford confirming that timeline.¹¹⁵ However, Blaine Dohman, one of the paramedics that responded, testified that Ms. Fero told him that Brynn was injured and put on the couch around 7 p.m.¹¹⁶ Ms. Fero recounted a similar timeline at trial.¹¹⁷

The State also argued that some of Ms. Fero's actions on the night in question were contrary to how an innocent person would act. For example, the State argued that any person in Ms. Fero's position would have immediately given Mr. Ackley's phone number to the 911 operator or to the paramedics, but Ms. Fero did not do so.¹¹⁸ However, Detective Norton testified that the paramedics told him that Ms. Fero acted appropriately, given the situation.¹¹⁹

C. Ms. Fero's Record Since Incarceration

Ms. Fero's focus while she has been in prison has been on maintaining a close bond with her family, her three children in particular, helping other inmates maintain connections with their children and, over

¹¹⁴2 RP at 192 (Mar. 12, 2003).

¹¹⁵V-A RP at 102 (Mar. 17, 2003).

¹¹⁶1 RP at 41 (Mar. 10, 2003).

¹¹⁷V-A RP at 84-86 (Mar. 17, 2003).

¹¹⁸*See, e.g.*, V-B RP at 151 (Mar. 17, 2003).

¹¹⁹2 RP at 203 (Mar. 12, 2003).

the last year, battling breast cancer.¹²⁰ Ms. Fero does everything she can to stay involved in the daily lives of her children. She reads stories to them over the phone at bedtime and participates in their parent-teacher conferences.¹²¹

To support other inmates, Ms. Fero co-founded The Women's Village, an organization that supports inmates as they try to change their communities for the better.¹²² She is particularly involved in the family support sub-council of The Women's Village, which facilitates parenting support groups and workshops.¹²³ She has also participated in other organizations to help her fellow inmates and has an exemplary disciplinary record.¹²⁴

D. Procedural History

On March 18, 2003, a jury found Ms. Fero guilty of first degree assault of a child.¹²⁵ Ms. Fero appealed, challenging the sufficiency of the evidence, the constitutionality of the jury instructions, and her 180-month

¹²⁰Declaration of Heidi Charlene Fero (hereinafter Fero Decl.) ¶¶ 12-21.

¹²¹*Id.* ¶¶ 13-14.

¹²²*Id.* ¶ 15.

¹²³*Id.* ¶ 16.

¹²⁴*Id.* ¶¶ 12-20, 22.

¹²⁵Trial Tr. 212 (Mar. 18, 2003).

exceptional sentence.¹²⁶ This Court held that this evidence was sufficient and that the jury instructions were constitutional.¹²⁷ The Washington State Supreme Court granted Ms. Fero's petition for review of the sentencing issue, and remanded the case to the Court of Appeals for further consideration in light of *State v. Hughes*, 154 Wn.2d 118 (2005).¹²⁸ The Court of Appeals amended its opinion and remanded to the trial court for resentencing under *Hughes* and *Blakely v. Washington*, 542 U.S. 296 (2004).¹²⁹ On remand, Ms. Fero was resentenced to 120 months in prison.

This is her first personal restraint petition.

IV. ARGUMENT

Ms. Fero is innocent, and she likely would not have been charged with a crime, let alone convicted, if doctors knew in 2003 what they know now. Specifically, the new medical consensus is that a child can, and often will, be lucid for up to 72 hours after suffering trauma that causes symptoms like Brynn's.¹³⁰ This evidence refutes the State's position that Brynn must have been injured while in Ms. Fero's care, because Brynn could not have remained conscious for more than a few minutes after

¹²⁶*Fero*, 125 Wn. App. at 87.

¹²⁷*Id.*

¹²⁸*State v. Fero*, 154 Wn.2d 1032, 119 P.3d 852 (2005) (Table, No. 76573-1).

¹²⁹*Fero*, 125 Wn. App. at 102.

¹³⁰*See Barnes Decl.* ¶¶ 6, 46-48.

being injured. New medical evidence also shows that a host of things can cause symptoms like Brynn's, from low-impact traumatic events like accidental falls from a bed to infection, metabolic disorders, and congenital disorders. This evidence refutes the State's position that an adult must have shaken Brynn. Either of these lines of evidence raise a reasonable doubt about Ms. Fero's guilt.

Under RAP 16.4, a petitioner is entitled to a new trial if new "[m]aterial facts exist [that] have not been previously presented and heard, which in the interest of justice require vacation of the conviction."¹³¹ To satisfy this standard, the new evidence (1) must probably change the result of the trial; (2) must have been discovered since the trial; (3) could not have been discovered before the trial by the exercise of due diligence; (4) must be material; and (5) must be not merely cumulative or impeaching.¹³²

The following three sections analyze how the new medical research satisfies the RAP 16.4 standard for a new trial. The new, material medical evidence contradicts the medical evidence upon which Ms. Fero's conviction rests and would change the result of her trial.

¹³¹RAP 16.4(c)(3).

¹³²*In re Brown*, 143 Wn.2d 431, 453, 21 P.3d 687 (2001) (citations omitted).

A. The New Medical Evidence Would Change the Result of Ms. Fero's Trial

The following sections explain, in detail, why Ms. Fero's new medical evidence would "probably change the result of the trial."¹³³ First, the new medical evidence directly contradicts the most critical evidence that the State offered to prove its case against Ms. Fero. Second, Ms. Fero could not have been convicted without the State's now-refuted medical testimony.

1. New Medical Evidence Refutes the State's Medical Evidence.

Ms. Fero's newly discovered medical evidence directly contradicts the State's case against her. At trial, Dr. Gorecki,¹³⁴ Dr. Ockner,¹³⁵ and Dr. Lukshu¹³⁶ all testified that Brynn could not have remained conscious for more than a few minutes after suffering her injuries. In fact, the State

¹³³ See *State v. Roche*, 114 Wn. App. 424, 435-39, 59 P.3d 682 (2002).

¹³⁴ 1 RP at 74 (Mar. 12, 2003) (stating that "it could take 5 or 10 minutes" for a child to lose consciousness).

¹³⁵ 1 RP at 97 (Mar. 12, 2003) ("[I]f the blow is severe enough that cause [*sic*] diffuse axonal injury typically – or a shaking injury, typically a patient loses consciousness right away.").

¹³⁶ 2 RP at 195 (Mar. 11, 2003) ("With this severe injury, I doubt if she had cried at all. She would have been almost immediately unconscious and not doing anything [*sic*] initially.")

argued that “we know from the medical testimony that when you’re shaken that hard, you’re going to immediately go unconscious.”¹³⁷

Since Ms. Fero’s trial in 2003, doctors have all but abandoned the view that children necessarily lose consciousness immediately after sustaining severe brain injuries. Instead, doctors now generally accept that children can remain lucid for up to 72 hours after suffering trauma. For example, one 2003 report in the literature describes a nine-month-old child who fell 30 inches from a bed onto a concrete floor.¹³⁸ During an investigation by police, three adults independently corroborated that the child acted normally after the fall.¹³⁹ However, 72 hours after the fall, he was found dead.¹⁴⁰ An autopsy revealed subdural hemorrhage, cerebral edema, skull fracture, and other injuries similar to Brynn’s.¹⁴¹

Recent literature suggests that extended periods of lucidity, even with severe injuries like those of the child described above, are not anomalies. For example, a peer-reviewed 2005 article by Dr. K.B. Arbogast, Director of the Pediatric Injury Prevention Program at the

¹³⁷V-B RP at 148 (Mar. 17, 2003).

¹³⁸Scott Denton & Darinka Mileusnic, *Delayed Sudden Death in an Infant Following an Accidental Fall: A Case Report with Review of the Literature*, 24 AM. J. FORENSIC MED. & PATHOLOGY 371 (2003).

¹³⁹*Id.*

¹⁴⁰*Id.*

¹⁴¹*Id.*

Children's Hospital of Philadelphia, documented a study of 314 children (including 191 children under the age of two) that had suffered fatal brain injuries.¹⁴² It concluded that 10.6% of the children under two years old had a Glasgow Coma Scale ("GSC") score of 8 or above (where a score of 3 describes a completely non-responsive child and a score of 15 describes one with no impaired functions) when they arrived at the hospital.¹⁴³ High GSC scores were even more common in cases of inflicted injury.¹⁴⁴ This study confirmed that a significant percentage of infants, perhaps more than 10%, will remain lucid for hours, or even days, after suffering traumatic head injuries.¹⁴⁵

This new evidence regarding lucid intervals refutes the State's experts' testimony at trial. Contrary to what those experts told the jury, it is not possible to determine that Brynn was injured while in Ms. Fero's care.¹⁴⁶ In fact, the new evidence shows that Brynn may have been injured days before arriving at Ms. Fero's home.¹⁴⁷ Although this new

¹⁴²Kristy B. Arbogast *et al.*, *Initial Neurologic Presentation in Young Children Sustaining Inflicted and Unintentional Fatal Head Injuries*, 116 PEDIATRICS 180 (2005).

¹⁴³*Id.* at 183.

¹⁴⁴*Id.*

¹⁴⁵*Id.*

¹⁴⁶Ophoven Decl. ¶¶ 22, 25, 27, 33.

¹⁴⁷*Id.* ¶¶ 22-27.

evidence does not establish when exactly Brynn was injured, it raises a reasonable doubt about whether she was injured while with Ms. Fero.¹⁴⁸

Additionally, since Ms. Fero's trial, doctors have discovered numerous other conditions that mimic the symptoms of shaken baby syndrome. At Ms. Fero's trial, the State's medical experts testified that Brynn's injuries could only have been caused by one of two possible events: (1) major accidental trauma, such as a car crash or a fall from a multistory building; or (2) child abuse by severe shaking. However, as Dr. Barnes explains in his declaration, there are now at least 12 medically acknowledged causes of the triad.¹⁴⁹ Even considering injuries caused by trauma only, there is no way to tell whether those injuries were accidentally suffered or intentionally inflicted.

Perhaps most important, it is now known that low-impact trauma can cause the triad. One example from the literature documents the case of a four-month-old boy who arrived at the hospital with a skull fracture, subdural and intraventricular hemorrhage, brain herniation, and retinal hemorrhages.¹⁵⁰ These injuries, and the retinal hemorrhages in particular,

¹⁴⁸*Id.*

¹⁴⁹Barnes Decl. ¶ 43.

¹⁵⁰Gregg T. Lueder *et al.*, *Perimacular Retinal Folds Simulating Nonaccidental Injury in an Infant*, 124 ARCHIVES OF OPHTHALMOLOGY 1782 (2006).

were once considered diagnostic of nonaccidental trauma. However, based on the statements from two adult eyewitnesses describing how a twelve-year-old fell on the boy, forensic investigators concluded that the death was an accident.¹⁵¹ As Dr. Ophoven notes, a small child is more than capable of generating sufficient force to cause the triad in an infant or toddler.¹⁵² This evidence directly contradicts the testimony of Dr. Ockner, Dr. Lukshu, Dr. Bennett and Dr. Grewe, the State's medical experts who testified that it was not possible for minor accidental trauma to cause Brynn's injuries.

Based on the record available at trial, it is impossible to tell exactly what caused Brynn's injuries. The record contains evidence that Brynn could have suffered from hypoxia-ischemia or trauma. Ms. Fero testified that she saw blood coming out of Brynn's mouth after Kaed jumped out of Brynn's playpen. This blood could have clogged Brynn's airway enough to have reduced the flow of oxygen to her brain, causing the triad. Kaed also hit Brynn with one or more toys, hit her head into the wall, or landed on top of her when he jumped into the playpen. Medical evidence unavailable at the time of trial shows that seemingly low-impact events like these can cause the triad in some situations.

¹⁵¹ *Id.*

¹⁵² Ophoven Decl. ¶¶ 11, 34.

We may never know what happened to Brynn, but that is not what the State's experts told the jury. They said that the only potential cause of Brynn's injuries was child abuse. Their opinions were based on outdated medical knowledge. The new medical evidence discussed above refutes their opinions and, if available in 2003, would have changed the result of Ms. Fero's trial.

Decisions from other jurisdictions demonstrate that the medical consensus about lucid intervals and causes of the triad has significantly changed since Ms. Fero's trial in 2003. In *State v. Edmunds*, 308 Wis. 2d 374, 746 N.W.2d 590 (Wis. Ct. App. 2008), the Wisconsin Court of Appeals evaluated new medical evidence, similar to Ms. Fero's, presented by a woman convicted of first-degree reckless homicide for allegedly shaking a seven-month-old infant. The Wisconsin Court of Appeals held that "there is a reasonable probability that a jury, looking at both the new medical testimony and the old medical testimony, would have a reasonable doubt as to Edmunds's guilt."¹⁵³

The Wisconsin court granted Edmunds's petition for a new trial based on evidence from qualified experts who testified

¹⁵³*Id.* at 599.

that a significant and legitimate debate in the medical community has developed in the past ten years over whether infants can be fatally injured through shaking alone, whether an infant may suffer head trauma and yet experience a significant lucid interval prior to death, and whether other causes may mimic the symptoms traditionally viewed as indicating shaken-baby or shaken impact syndrome.¹⁵⁴

The Wisconsin Court of Appeals held that Ms. Edmunds was entitled to a new trial for two reasons. First, new evidence showed that there was a fierce debate about the causes of the triad and whether a child could be lucid after suffering injuries that lead to the triad.¹⁵⁵ Second, Ms. Edmunds could not have presented evidence of this debate at her first trial.¹⁵⁶ The “emergence of a legitimate and significant dispute within the medical community” raised “a reasonable probability” that a jury would have reasonable doubt.¹⁵⁷ The similar facts, the similar new evidence, and a persuasive analysis of the *Edmunds* court support Ms. Fero’s argument that she is entitled to a new trial under RAP 16.4.

Another recent case, from the Seventh Circuit Court of Appeals, discusses the new medical literature regarding lucid intervals in the

¹⁵⁴*Id.* at 596.

¹⁵⁵*Id.* at 599.

¹⁵⁶*Id.*

¹⁵⁷*Id.*

context of a malicious prosecution claim.¹⁵⁸ In that case, police suspected a child's day care provider of causing brain injuries by shaking the eleven-month-old.¹⁵⁹ The defendant was not tried, however, because medical professionals determined that it was highly unlikely that the child's collapse was caused by injuries sustained while in the defendant's care.¹⁶⁰ The Seventh Circuit noted that

[a]lthough the medical profession once thought that there is no interim between trauma and collapse in shaken-baby syndrome, the medical profession now believes . . . that there can be an interim in which the child would be conscious, but probably lethargic or fussy or feverish or have difficulty sleeping or eating.¹⁶¹

In reaching this conclusion, the court relied on the *Edmunds* case from Wisconsin, a *New York Times Magazine* article discussing multiple successful domestic and international challenges to shaken baby syndrome

¹⁵⁸ *Aleman v. Vill. of Hanover Park*, 662 F.3d 897 (7th Cir. 2011).

¹⁵⁹ *Id.* at 902.

¹⁶⁰ *Id.* at 903.

¹⁶¹ *Id.* at 902-03 (noting also that some child abuse experts believed lucid intervals were possible as early as 2005).

convictions based on new evidence,¹⁶² and the scholarly literature describing the prevalence of lucid intervals.¹⁶³

In a case with particularly striking facts, the Texas Court of Criminal Appeals recently granted a new trial to Cathy Lynn Henderson, who was on death row for the murder of an infant, Brandon Baugh.¹⁶⁴ After Brandon's parents left him with Ms. Henderson, his regular babysitter, Ms. Henderson and Brandon disappeared.¹⁶⁵ When Ms. Henderson was captured (she had fled the state), she admitted that Brandon was dead and that she had buried his body.¹⁶⁶ At her 1995 trial, the sole contested issue was whether Ms. Henderson had intentionally killed Brandon.¹⁶⁷ Ms. Henderson claimed that Brandon slipped from her arms onto a linoleum-covered concrete floor.¹⁶⁸ The state's experts argued that the only way to explain Brandon's injuries, which included a depressed skull fracture, was child abuse.¹⁶⁹

¹⁶²Emily Bazelon, "Shaken-Baby Syndrome Faces New Questions in Court," *N.Y. Times Magazine*, Feb. 6, 2011, at MM30.

¹⁶³Arbogast *et al.*, 116 PEDIATRICS at 180.

¹⁶⁴*Ex parte Henderson*, 384 S.W.3d 833 (Tex. Crim. App. 2012).

¹⁶⁵*Id.* at 837 (Cochran, J. concurring).

¹⁶⁶*Id.* at 837-38.

¹⁶⁷*Id.* at 838.

¹⁶⁸*Id.*

¹⁶⁹*Id.* at 839-41.

In a state habeas petition, Ms. Henderson argued that she was entitled to a new trial because of new medical evidence regarding “advances in the science of pediatric head trauma.”¹⁷⁰ On remand for an evidentiary hearing, the trial court concluded that Ms. Henderson “has proven by clear and convincing evidence that no reasonable juror would have convicted her of capital murder in light of her new evidence.”¹⁷¹ The court of appeals held that the trial court’s findings were supported by the record and remanded the case for a new trial.¹⁷²

In a very recent case, the United States District Court for the Northern District of Illinois found that new evidence, presented at a nine-day evidentiary hearing, supported Jennifer Del Prete’s actual innocence claim.¹⁷³ Ms. Del Prete, an employee at a home-based daycare, was the only adult present when a three-month-old in her care became unresponsive; the baby died ten months later. Ms. Del Prete was convicted of first-degree murder after medical professionals testified that the baby’s subdural hematomas could only be caused by shaking and that

¹⁷⁰*Id.* at 837.

¹⁷¹*Id.* at 834 (per curiam).

¹⁷²*Id.*

¹⁷³ *Del Prete v. Thompson*, No. 1:10-cv-05070, 2014 WL 269094 (N.D. Ill. Jan. 27, 2014).

the onset of symptoms must have occurred immediately following the abuse.¹⁷⁴

Ms. Del Prete filed a habeas corpus petition in federal court claiming, in part, that new evidence demonstrated her actual innocence.¹⁷⁵ At an extensive evidentiary hearing in late 2012 and early 2013, both sides presented expert medical testimony. Evaluating the evidence presented at trial and the new medical testimony presented at the evidentiary hearing, the court determined that no reasonable juror would find Ms. Del Prete guilty beyond a reasonable doubt.¹⁷⁶ The court considered particularly persuasive the testimony from both sides' experts that at least some of the baby's injuries existed before the day of her collapse and that a child could have a lucid interval after suffering abusive head trauma.¹⁷⁷

These cases all recognize that there has been a profound shift in medical thinking about pediatric head trauma. This shift is supported by conclusions in scholarly literature discussing the unraveling of the old consensus about the impossibility of lucid intervals and the level of force required to cause the triad. For example, Professor Deborah Tuerkheimer

¹⁷⁴ *Id.* at*6, *39.

¹⁷⁵ *Id.* at *1.

¹⁷⁶ *Id.* at *45.

¹⁷⁷ *Id.* at *42-43.

has noted that although the debate about shaken baby syndrome is remarkably polarized, both sides have essentially agreed that (1) the triad is not necessarily caused by shaking, (2) in the absence of external signs of head trauma, doctors cannot clinically determine whether the triad is caused by accidental forces or non-accidental forces, and (3) a “period of time can exist where a child is impaired but functioning, making the lucid interval ‘a distinct discomfoting but real possibility.’”¹⁷⁸

In sum, the declarations from Dr. Barnes and Dr. Ophoven, the new medical literature, recent scholarly articles, and recent case law demonstrate a massive shift in medical thinking about shaken baby syndrome.¹⁷⁹ Doctors have abandoned the once-consensus view that children would not remain lucid for any significant period of time after suffering injuries that lead to the triad. Medical science since 2003 has proven that view false, and even supporters of the theory that the triad can be caused by shaking alone agree that lucid intervals of up to 72 hours are possible. This new medical evidence creates a reasonable doubt of

¹⁷⁸Deborah Tuerkheimer, *The Next Innocence Project: Shaken Baby Syndrome and the Criminal Courts*, 87 Wash. U. L. Rev. 1, 16-21 (2009).

¹⁷⁹See *Cavazos v. Smith*, ___ U.S. ___, 132 S. Ct. 2, 10 (2011) (Ginsburg, J., dissenting) (“Doubt has increased in the medical community over whether infants can be fatally injured through shaking alone.”) (internal quotations and citation omitted).

Ms. Fero's guilt, because Ms. Fero can now show that Brynn's injuries could have occurred well before Brynn arrived at Ms. Fero's house.

Doctors have also abandoned the once-consensus view that only child abuse or major trauma, such as a car crash or a fall from a multi-story building, can cause the triad. But, new evidence shows that a variety of causes, including accidental, low-impact events like a fall from a chair, can cause the triad. This new medical evidence creates a reasonable doubt about Ms. Fero's guilt because Ms. Fero can now show, using new medical evidence, that Brynn's injuries could have been caused by an accidental fall, an undiagnosed medical condition, or even by Brynn's brother, Kaed.

2. Ms. Fero Could Not Have Been Convicted Without the State's Now-Refuted Medical Evidence.

The State's medical evidence regarding the impossibility of lucid intervals and the level of force necessary to cause Brynn's brain injuries was crucial to the State's case. Ms. Fero could not have been convicted without those lines of evidence.

At trial, the State alleged that Ms. Fero had intentionally assaulted Brynn, recklessly inflicting great bodily harm.¹⁸⁰ Great bodily harm is

¹⁸⁰1 RP at 108-09 (Mar. 11, 2003).

statutorily defined as “bodily injury which creates a probability of death . . . or which causes a significant permanent loss or impairment of the function of any bodily part or organ.”¹⁸¹ Ms. Fero disputed that she had intentionally assaulted Brynn and that she had recklessly inflicted great bodily harm.

To establish the “intentional assault” element, the State argued that the medical testimony established both that Ms. Fero assaulted Brynn and that the assault was intentional. Specifically, the State argued that only violent shaking could have caused Brynn’s head injuries and that an adult must have caused the injuries. The State implicitly argued that the level of force required to cause Brynn’s injuries necessarily meant that the assault was intentional. Without the State’s now-outdated medical evidence, the State could not have established intent.

Only Brynn’s brain injuries constitute “great bodily harm” under the statutory definition. Brynn’s other injuries, including her retinal hemorrhages, several bruises, and a toddler’s fracture, do not constitute “great bodily harm” under the statute, and the State never contested otherwise. The State’s experts acknowledged that Brynn’s retinal hemorrhages were temporary and that they would not permanently impair

¹⁸¹RCW 9A.04.110(4)(c).

Brynn's vision. None of the State's experts argued that the bruises on Brynn's face and body would lead to, or were evidence of, great bodily harm. Moreover, the State's experts acknowledged that a child could have caused the bruising, and they did not offer any opinions on precisely how or when the bruises occurred. Finally, the State's experts did not argue, nor could they, that Brynn's broken leg constituted "great bodily harm."

Without the State's medical evidence regarding lucid intervals and the force required to cause the triad, there would not have been enough evidence to convict Ms. Fero. The evidence of Ms. Fero's allegedly inconsistent statements neither proves nor disproves that Ms. Fero assaulted Brynn. The statements show that Ms. Fero was under extreme stress and potentially confused, nothing more. But, even examining the statements in a light most favorable to the State, they have no bearing on the elements of first-degree assault of a child that the State was required to prove. The evidence regarding Brynn's other injuries and Ms. Fero's allegedly inconsistent statements is not sufficient to support Ms. Fero's conviction. Without the State's now-outdated and unreliable medical evidence, Ms. Fero's conviction cannot stand.

* * *

The State's case against Ms. Fero rested on two key lines of expert testimony that the medical profession has since abandoned. In light of current medical knowledge, it is no longer possible for medical experts to credibly argue that Brynn would have lost consciousness immediately after sustaining her injuries. Additionally, it is no longer possible for medical experts to credibly argue that only an adult could have caused Brynn's injuries, as opposed to an accidental trauma or other innocent causes. Without these lines of evidence, Ms. Fero could not have been convicted. Because the new medical consensus contradicts the only evidence the State offered to prove the elements of first degree assault of a child, the new medical evidence would change the result of trial.¹⁸²

B. The New Evidence Was Not, and Could Not Have Been, Discovered Before Trial Because It Was Not Published Until After Trial

The new medical evidence regarding the prevalence of lucid intervals and levels of force necessary to cause the triad was discovered by Ms. Fero after her trial in 2003. Ms. Fero could not have discovered it earlier because the medical evidence was not available.

¹⁸² See *Edmunds*, 746 N.W.2d at 599 (holding that the "emergence of a legitimate and significant dispute within the medical community" regarding the cause of a child's brain injuries established a "reasonable probability" that a jury would have reasonable doubt).

Most of the studies cited by Dr. Barnes and Dr. Ophoven were published after Ms. Fero's trial. Although there were anecdotal reports before 2003 of children with head injuries having significant lucid intervals, there were no systematic studies of the issue until 2005.¹⁸³ Even if these obscure anecdotal reports had been uncovered before trial, they were not generally accepted. However, later research confirmed these anecdotal reports in a systemic way, and the medical community now generally accepts that significant lucid intervals are possible.

Similarly, the medical community started questioning, before 2003, whether other conditions mimicked the symptoms of shaken baby syndrome.¹⁸⁴ However, until after Ms. Fero's trial, this research was considered outside the mainstream. It did not gain general acceptance until after Ms. Fero's trial.

The research regarding the prevalence of lucid intervals and the variety of potential causes of the triad was not available to Ms. Fero at her trial, and it would have been impossible for her to discover it regardless of her diligence.

¹⁸³ Barnes Decl. ¶ 47; Ophoven Decl. ¶ 12.

¹⁸⁴ Barnes Decl. at ¶ 21.

C. The New Evidence Is Material and Not Merely Cumulative or Impeaching

The new medical evidence regarding lucid intervals and the causes of Brynn’s brain injuries is material and not merely cumulative or impeaching. Evidence is material when it tends to disprove the validity of scientific evidence used to convict a petitioner.¹⁸⁵ The newly discovered medical evidence is material because it directly contradicts the only evidence that the State offered at trial to prove the elements of first-degree assault of a child.

The Washington Supreme Court has defined cumulative evidence as ““additional evidence of the same kind to the same point.””¹⁸⁶ Evidence is not merely cumulative or impeaching when it refutes the validity of scientific evidence used to convict a petitioner, such as by rendering the scientific evidence inadmissible.¹⁸⁷ The new medical evidence is not cumulative or offered to impeach. Ms. Fero did not, and could not, present similar evidence at trial because it was not known. Moreover, the evidence is not offered to impeach because it refutes the opinions offered

¹⁸⁵See *In re Delmarter*, 124 Wn. App. 154, 167, 101 P.3d 111 (2004) (holding that new evidence is material, in a drug possession conviction, when the evidence casts doubt on the accuracy of drug tests performed on substances found on the accused).

¹⁸⁶ *State v. Williams*, 96 Wn.2d 215, 223-24, 624 P.2d 868 (1981) (quoting *Roe v. Snyder*, 100 Wash. 311, 314, 170 P. 1027 (1918)).

¹⁸⁷See *Roche*, 114 Wn. App. at 438 (“Moreover, the evidence of [a lab chemist’s] malfeasance is more than ‘merely’ impeaching; it is critical with respect to . . . the validity of his testing . . .”).

by the State's experts rather than merely attacking their credibility. The new evidence of the possibility of a lucid interval, the mimics of shaken baby syndrome, and the shortcomings of the shaken baby syndrome theory is not "additional evidence of the same kind." It raises new points that have not been presented to a jury.

Ms. Fero is not alone in believing that the new medical evidence is material and casts significant doubt on the basis for shaken baby syndrome convictions. In Maricopa County, Arizona, two convictions have been overturned since 2011 after the defendants presented new medical evidence.¹⁸⁸ And in California, Governor Jerry Brown commuted the sentence of a woman, the grandmother of the deceased child, whose case became the subject of a contested procedural battle between the Ninth Circuit Court of Appeals and the United States Supreme Court.¹⁸⁹ The governor cited "significant doubts" regarding her guilt.¹⁹⁰ The new medical evidence is material and corroborates Ms. Fero's persistent claim that she is innocent.

¹⁸⁸ Emily Bazelon, "The Exoneration of Drayton Witt," *Slate.com*, Oct. 31, 2012, available at http://www.slate.com/articles/news_and_politics/jurisprudence/2012/10/what_the_exoneration_of_arizona_father_drayton_witt_means_for_shaken_baby.html.

¹⁸⁹ See *Cavazos*, 132 S. Ct. 2.

¹⁹⁰ L.A. Now, "Jerry Brown commutes grandmother's murder sentence," *L.A. Times*, Apr. 6, 2012, available at <http://latimesblogs.latimes.com/lanow/2012/04/shaken-baby-clemency.html>.

* * *

The evidence satisfies the RAP 16.4 standard for a new trial because it was unavailable during the 2003 trial, is material and not merely impeaching, and would have changed the result of the trial by casting reasonable doubt that Brynn was abused while in Ms. Fero's care. Even examining the new evidence in the light most favorable to the State, the new medical literature, studies, and expert opinions demonstrate the existence of a "significant and legitimate debate" within the medical community.

In light of the new consensus regarding lucid intervals and the myriad causes of the trial, the testimony the State offered in 2003 would likely not be admissible today because it is no longer generally accepted.¹⁹¹ Even if it were admissible, Ms. Fero can now offer opposing experts that could rely on generally accepted scientific studies, which was not possible for her in 2003. A jury evaluating the competing experts, and the old and new medical evidence, would have reasonable doubt about Ms. Fero's guilt.¹⁹² Therefore, Ms. Fero is entitled to a new trial under RAP 16.4.

¹⁹¹See *State v. Cauthron*, 120 Wn.2d 879, 888, 846 P.2d 502 (1993).

¹⁹²*Edmunds*, 746 N.W.2d at 596.

V. CONCLUSION

Ms. Fero knows that she did not abuse Brynn. She has waited in prison for nearly 10 years for medical research to catch up to the truth. In that time, she has focused on staying involved with her family and supporting fellow inmates. With her exemplary disciplinary record, Ms. Fero may soon be eligible for work release. Although she is looking forward to her release, she is pursuing this personal restraint petition with the hopes of enjoying her full legal rights and ameliorating the other consequences of her wrongful conviction.

At her trial, Ms. Fero could not dispute the State's medical testimony about shaken baby syndrome. Today, she can show that the State's medical testimony is wrong on two critical points. First, Brynn may have been injured well before she arrived at Ms. Fero's house, evidenced by the new, widely accepted medical scholarship documenting the prevalence of a lucid interval in children suffering brain trauma. Second, Brynn's injury may have been caused by an accident or undiagnosed medical condition, supported by evidence that even minor falls or other small children can cause severe head injuries in infants and toddlers. These parallel, but related, lines of medical evidence directly refute the only evidence of Ms. Fero's guilt. Because the new evidence would change the result of Ms. Fero's trial, is material, and could not have

been discovered before her trial, Ms. Fero is entitled to a new trial under
RAP 16.4.

DATED: May 5, 2014

PERKINS COIE LLP

By: s/ J. Christopher Baird

J. Christopher Baird,
WSBA No. 38944
Maragret C. Hupp
WSBA No. 43295
1201 Third Avenue, Suite 4900
Seattle, WA 98101-3099
Telephone: 206.359.8000
Facsimile: 206.359.9000

**INNOCENCE PROJECT
NORTHWEST**

By: s/ M. Fernanda Torres

M. Fernanda Torres
WSBA No. 34587
PO Box 85110
Seattle, WA 98145-1110
Telephone: 206.543.5780

Attorneys for Petitioner
Heidi Charlene Fero

No. _____

COURT OF APPEALS, DIVISION II
OF THE STATE OF WASHINGTON

In re Personal Restraint Petition of
Heidi Charlene Fero

**DECLARATION OF
HEIDI CHARLENE FERRO**

I, Heidi Fero, being competent to testify regarding the matters stated herein, declare under oath as follows:

1. I have spent years in prison for a crime that I did not commit. I do not know for sure what happened to Brynn Ackley on the night of January 7, 2002, but I know that I did not hurt her.

2. During my trial, I sat in disbelief as the State's medical experts said that I did horrible things to Brynn. I never hurt Brynn, and I have never hurt any other child. It would have been completely against my nature to hurt Brynn. I have always been a compassionate and gentle caregiver, not the monster that the prosecutor made me out to be. Because I do not believe that this came through adequately at trial, I describe below my background and nature.

3. I also describe below my experience in prison. Even though I know that I did not hurt Brynn, I have tried to make my experience in prison as positive as possible. I have maintained very close ties with my family and community, have not had any disciplinary problems, and have tried to be a role model and mentor for other inmates.

4. I do not have any medical training, and it is impossible for me to keep up with the medical research on shaken baby syndrome. But, I am thankful that the new research proves what I have known all along—that I did not hurt Brynn.

5. Before the night that Brynn went unconscious at my house, many friends and neighbors had trusted me to watch over their children. I always treated those children with patience, care, and respect, never violence. There has never been an instance, other than with Brynn, where someone has thought I harmed a child.

6. My method of disciplining children has always been to try to talk through issues with them and, if that doesn't work, use time-outs or remove privileges. I do not hit or spank children, and I never hit, spanked, or physically harmed Brynn in any way.

7. My friends and family have often looked to me for advice on parenting. For example, my brother, Kristian Burch, asked me for advice on dealing with his daughter's tantrums. I have experience—from raising

my own children and watching other children—dealing with tantrums and crying kids. Although I certainly empathize with crying children, I have never gotten angry or lost my temper with them.

8. I would never hurt anyone, let alone a child. The prosecutor argued during my trial that I "lost it" and hurt Brynn, but I did not "lose it" that night and I have never "lost it" in any other situation.

9. I did not lose my temper with Brynn, but I no doubt seemed hysterical on the 911 call, to the paramedics, and to the police. I was extremely upset by what had happened. Although I didn't know then, and don't know now, who or what hurt Brynn, I was horrified when she went unconscious. I was scared for her and her family, and I did not know what to do. I don't remember ever being in such a terrifying situation before then.

10. Although I was distraught over Brynn's condition, I was not angry or frustrated with her that night. Before this case, nobody ever criticized me for getting angry, whether with adults or with children.

11. After the prosecutor accused me of hurting Brynn, the state took my children away. After conducting a full investigation, DSHS decided that I was not a danger to my children and returned them to me.

12. When I arrived at the Washington Corrections Center for Women (WCCW) in 2006, I was terrified that I would lose my 3 children.

Although this whole ordeal has been very hard on me and my family, I've done everything within my power to be a loving and supportive mother.

13. Being a parent from prison has been a huge challenge. To stay connected with my children, I have worked with WCCW, my family, my children's schools, and others to create a network, or "village," to help me parent from prison. It has been especially challenging over the last year or so. I was diagnosed with breast cancer in January of 2013. I went through 12 weeks of chemotherapy and 6 weeks of radiation therapy, and a mastectomy, and was in the hospital for a week. My treatment successfully ended in July of 2013.

14. Because of this network, I actively participate in my children's lives. I talk with and see my children as much as I can, and try to do everything I can to make sure their lives are as normal as possible. I participate in their parent-teacher conferences, read to them at night, and help them with their homework. I'm involved in Rachel's Girl Scout troop, which has one sleepover a year at the facility, and I've helped Rachel sell cookies. I have also been granted permission to have extended family visits. These are 48-hour visits on-site at WCCW that happen every six to eight weeks. To get this privilege, you have to remain major infraction-free for a year, and only 10% of inmates qualify. The privilege

can be suspended for an infraction, and suspensions can last for between 90 days and five years. I have never been suspended.

15. I've drawn on my experience setting up this network to help other mothers in prison. I am a core-council member and founder of The Women's Village (a brochure for the program is attached as Exhibit A). The Women's Village supports inmates as they try to change their lives and community in positive ways. The Women's Village has been featured in "The Daily Communique," a Department of Corrections newsletter (the article is attached as Exhibit B – I am in the picture at the bottom right). Last year, I had the opportunity to speak with First Lady Inslee, Secretary Warner, Deputy Secretary Pacholke and others about The Women's Village, and attach a "Memo of Appreciation" for my efforts as Exhibit C.

16. I am also the leader of the Family Support sub-council of The Women's Village. That sub-council facilitates parenting groups, hosts workshops, and creates and supports other ways to build positive family relationships.

17. In addition to my work with The Women's Village, I am a senior facilitator for the "Mom's" group, which is a 2 1/2 hour orientation for mothers just arriving at WCCW. The orientation supports building healthy relationships with children and their caregivers, and encourages communication and honesty.

18. I'm also the facilitator and co-creator of "Finding Your Voice" and "Create A New You," workshops that are designed to encourage and foster growth and change among women who struggle with issues like low self-esteem and anger.

19. Additionally, I'm the senior facilitator for National Parenthood Initiative/Moms Involving Dads/Inside Out Moms, a class that teaches communication skills to help inmates and caregivers deal with parenting issues. I've attached a thank-you letter I received for this work as Exhibit D.

20. Through all of these programs, I have helped numerous women stay connected with their children despite incarceration. Many of these women have written me letters of thanks, and I've attached four examples. (Exhibits E, F, G, & H).

21. While I have spent as much time as possible focusing on my family and helping other inmates stay connected to their families, I have also taken college course work to prepare me for my eventual release. I completed a Sociology 101 course through Ohio State University, received certifications in HIPPA and Case-Aid through the State Department of Health and Human Services, and taken courses in Technical Design (computer-aided drafting) and Ornamental Horticulture and Design through Tacoma Community College.

22. I have not caused any trouble since coming to prison, and my disciplinary record is excellent.

23. I did not hurt Brynn, and I know that I should not be in prison. However, I have tried to make the best of this situation by caring for my children, supporting other inmates, and improving myself while here. I want nothing more than to be completely reunited with my family, and pray that the new medical evidence discussed in my personal restraint petition helps you see the truth of my innocence.

[the remainder of this page intentionally left blank]

DECLARED under penalty of perjury according to the laws of the State of

Washington, this 5th day of ~~March~~^{May}, 2014, at

Gig Harbor, Washington.

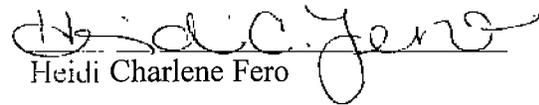

Heidi Charlene Fero

Exhibit A

The Women's Village



Mission Statement: To encourage & foster an atmosphere of change in our community, by harnessing our unique strengths, together as individuals to create a new culture based on the pursuit of personal excellence!

The Women's Village is a group of individuals who support a set of common values and who are committed to change, both in ourselves and in our community. Anyone who is committed to supporting The Women's Village values can be a member of The Women's Village. The following are a list of values that we have chosen to ascribe to and what they mean to us.

Respect: to set personal and social boundaries and make our expectations clear, live and lead by example, pick up after ourselves, avoid other's drama, treat others as we wish to be treated, take care of ourselves mentally and physically, and to practice good hygiene.

Honesty: being and living free from deception have high moral standards for self and others take responsibility for our thoughts and actions, ensure that my words match my actions.

Compassion: feel for the suffering of others, accept others, understand they hurt the same way that I do, be aware that there are many ways to respond to any given situation, be kind to self and others, be conscious of others distress.

Diversity: awareness that different cultures and perspectives exist, accepting that everyone has something to contribute, accepting and including those who are different from myself.

Self Empowerment: the freedom to be me, to realize and experience my full potential, enrich my life through my interactions with others, recognize and apply life lessons of

others, understand and embrace that discipline is freedom.

Education: embrace learning and growth, willingness to expand my experience, willingness to change my perspective about the world around me, develop myself mentally, emotionally, physically and spiritually, be well informed, challenge my values, commit to follow through with what I begin, put into action what I learn.

Usefulness: Employment of action or talent, make a benefit from what already exists, put resources to work, maintain a balance of internal and external energies in my actions.

The Village Sub Councils:

We discovered that as we started to make changes in our lives for the better, we were passionate about being a part of something bigger than just ourselves. We developed what we refer to as sub councils, which are small groups that pertain to a specific area surrounding that passion. We currently have 9 sub councils and as time goes on and more people join The Village our hope is that this number will grow as we become more aware of others and their passions as well. There are certain criteria one must meet to become a part of a sub council the following is a list of the sub council's and those criteria.

Education: The education team will seek out village members who have skills and or formal education and will be willing to help other offenders with educational needs They will work with offenders who have learning disabilities to help them achieve their goals.

Peer Support: The peer support team will have two levels of support in the form of village guides and peer mentors. Guides are temporary sponsors that will help offenders who

need assistance in dealing with the realities of prison life. They will be available to give information and answer questions or to direct offenders in the direction to get their questions answered. Peer mentors are village members who have had training to deal with specific issues like domestic violence and can be a support system for offenders that need it. They will work directly with mental health staff to provide this type of support.

Environmental: The environmental team will create sustainable programs and get women involved in creating a sustainable environment. They will create opportunities for women to get involved in recycling and teach others to do the same.

Morale building: This team will bring back a sense of order and respect within the institution by promoting a positive change in the way women deal with their feelings.

Health & Wellness: This team will facilitate wellness classes to include physical health, nutrition, mind, body and spirit.

Violence Reduction: This team will gauge the environment within the institution and come up with ways to reduce the violence.

Re-Entry: This team will facilitate programs that will help with the re-entry process like job readiness classes, resume workshops and dressing for success.

Spirituality: This team will give individuals a chance to explore their beliefs and learn how to apply them to life.

Family Support: This team will help to facilitate parenting groups, create positive ways to build on family relationships, and host workshops gauged around family dynamics.

Exhibit B



The Daily Communiqué

The Women's Village: A Source of Change for Incarcerated Women

By Rowlanda Cawthon, East Team Leader, Communications

Principles behind the mantra, "It takes a village to raise a child," have been adopted by a group of dedicated offenders at the Washington Corrections Center for Women. Both offenders and staff at the prison wanted to foster a positive community environment and propel women to shift their thinking, so they formed the Women's Village group to develop an approach that would change the prison culture.



Associate Superintendent Margaret Gilbert, center, joins offenders at Washington Corrections Center for Women who are hoping to change the culture of the prison through a new approach called Women's Village.

With the cuts to offender programming, the women realized the need to tap existing resources to foster a sense of growth, collaboration and commitment.

"The Women's Village has been a great way for the women to really start thinking about their lives and how they can influence each other," said Associate Superintendent Margaret Gilbert. "We've managed to get some staff on board and we are certain this project can change the culture of the prison."

The mission of the Women's Village is, "To encourage and foster an atmosphere of change by harnessing our unique strengths together as individuals and to create a new culture based on the pursuit of personal excellence."

The term Women's Village was created by Psychology Associate Robert Walker and offenders developed the purpose, values and structure of the program.

"The project offers the women a unique opportunity to share their personal experiences

and knowledge to inspire each other to change and make positive contributions to the community in which they all live — the prison," said Walker.

A village council serves the Women's Village in an advisory and governing capacity to provide leadership and direction. There are ten women on the council who work incredibly hard to create a healthier prison atmosphere. Their criminal backgrounds vary as do their custody levels, but this doesn't hinder their unified commitment.

Jeannette Murphy who has been incarcerated for 28 years firmly believes that the Women's Village is a practical resource.

"One goal of the village is to keep the women busy," said Murphy. "If we can help keep the women busy and assist them in finding their passion, we can address problems before they escalate and greatly reduce violence. We can work together to prevent another Jayme Biendl incident from occurring where we live."

As the project evolved, the women unanimously agreed that they needed to identify their passions and create work opportunities around what genuinely made them happy. This resulted in the formation of nine sub-councils that serve as a means to get women engaged in something bigger than themselves.

- **Violence Reduction Team** – Responsible for gauging the prison environment and identifying ways to reduce violence.
- **Health and Wellness Team** – Facilitates wellness classes to include women's health, nutrition and daily health routines.
- **Educational Team** – Assist offenders with their educational needs and work with offenders who have learning disabilities to help them achieve their goals.
- **Environmental Team** – Creates sustainable programs and get women involved in creating a sustainable environment.
- **Peer Support Team** – Help offenders who need assistance in dealing with the realities of prison life. Peer mentors also work directly with mental health staff.
- **Morale Building Team** – Bring back a sense of order and respect within the prison by promoting a positive change in the way women deal with their feelings.
- **Reentry Team** – Facilitates programs that will help with the reentry process including but not limited to job readiness classes, resume workshops and dressing for success.
- **Spiritually Team** – Gives women a chance to explore a variety of beliefs and become more in tune with their own, whatever they may be.
- **Family Support** – Facilitates parenting groups, create positive ways to build on family relationships, and host workshops centered on family dynamics.

Each team is lead by a council member who has a sincere passion for the work required. Women interested in the Women's Village must officially become a village member by participating in three orientations, two accountability circles, and committing to engage in two self-help groups or classes offered at the prison.

The orientations are lead by the council members and staff, and give an overview of the purpose and values of the Women's Village. The women are also given an opportunity during orientation to develop personal goals that will enable them to create a vision of who they are and who they are becoming. Accountability circles provide the women with an opportunity to meet regularly to discuss issues or problems they are facing, to set goals to address these issues, and to brainstorm ways to accomplish the goals.

"We are a group of women who want more for ourselves and we want the women around us to feel the same way," said Offender Renee Curtiss. "Having women believe in you and hold you accountable is the key to changing attitudes and behaviors, and that's what we are all about."

The values of the program are respect, honesty, compassion, diversity, self-empowerment, education and usefulness. These beliefs have been the driving forces behind the members' ability to assist offenders in transitioning from intensive management unit to less restrictive custody, developing recycling and gardening programs, and simply getting women to be a source of change for each other within prison walls.

Do you like this story?

The idea was submitted by a staff member at Washington Corrections Center for Women! If you know of a story that would make a great Daily Communiqué article, please email the communications unit.

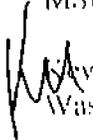
Exhibit C



STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
WASHINGTON CORRECTIONS CENTER FOR WOMEN
9601 Bujacich Road NW • Gig Harbor, Washington 98332 • Tel (253) 858-4200

July 26, 2013

TO: Heidi Fero DOC #891886
MSU

FROM:  Kevin Mauss, Associate Superintendent of Programs
Washington Corrections Center for Women

SUBJECT: Memo of Appreciation

I want to recognize your efforts in providing First Lady Inslee, Secretary Warner, Deputy Secretary Pacholke and other guests such a memorable impression of The Women's Village. In addition to your programming and work schedule, you spent extra time preparing for this event and making it a huge success. You are greatly appreciated.

You have made a positive investment with your time and work with both active and aspiring members of The Women's Village to assist in creating a positive environment for yourself and others.. Thank you for your dedication, commitment and willingness to share your time and resources working with the offenders at the Washington Corrections Center for Women as a Council member of The Women's Village.

Your efforts do not go unnoticed.

KM:km

cc: Counselor
Central File
File

Exhibit D

CARTER Design

"Community Involvement"

December 1, 2013

This letter of appreciation is hereby granted to Heidi Fero for co-facilitating another Inside Out Moms / Moms Involving Dads. This six-week course is geared to educate and assist moms in building a healthy and positive family environment. One of the primary goals is to reduce recidivism and ultimately eliminate incarceration within their families. The curriculum is focused on redefining the family structure from a distance through Involvement, Consistence, Awareness, and Nurturing among other critical tools for children to be successful. Co-facilitators are examples for other incarcerated parents to strengthen father-child, mother-child, care-giver child relationships.

As a co-facilitator, there are times when you have shared a personal moment and may have put yourself in a vulnerable situation, yet your focus was on helping someone else. Furthermore, as a co-facilitator, in your current environment, you continue to persevere for others and can be viewed as a role model.

Carter~By~Design "Community Involvement" is working to help families' rebuild relationships, absent parents connect with their children, and support parents' develop a village to help nurture their children. Carter~By~Design "Community Involvement" believes in the power of serving people and communities to start building a better world today, to ensure a stronger community tomorrow.

"Fruit of the Spirit" Galatians 5:21

Thank you,



Patrick Carter
Program Director - Facilitator
Carter~By~Design "Community Involvement"

Exhibit E

October 18, 2011
Oh-yut-lah-mah Keating #876615
Washington Corrections Center for Women
9601 Bujacich Rd NW
Gig Harbor, WA 98332-8300

Subject: Character Letter for Heidi Fero

Dear Sir or Madame:

My name is Oh-yut-lah-mah Keating. I am 35 years old and I am currently incarcerated at the Washington Corrections Center for Women in Gig Harbor, WA. I have lived and worked with Mrs. Fero for approximately five years and have become close with her and her family.

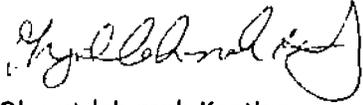
I know that Ms. Fero is here for 1st degree assault against a minor. I know that prison has impacted Heidi's life in a myriad of ways, some positive, some negative. Not only has she had to shed some preconceived notions about the type of people who come to prison, but Heidi has also come to understand how it is that she could positively affect others in her same situation. One of Heidi's biggest fears was also one of her biggest strengths: her family. She was afraid that due to her incarceration that she would lose her place in her family unit and that her influence in the lives of those she loves would be diminished. This prompted her to be an avid supporter of all family oriented programming within the facility. By her example, she taught other women that they each could build, maintain, and strengthen their family and community ties even in the face of adversity.

Before I got to know Heidi I had some very strong negative ideas about women that were here for similar crimes. I had no understanding or empathy for someone who could hurt a child. Being friends and roommates with Heidi changed my perspective about not only people who have been convicted of child crimes, but also the reality of a lifestyle with which I have no previous experience. Her example showed me that in my own life, I have the power to be a positive influence in the lives of my children and my husband. There are many women here who have had a bad familial history, and had no way to see life and family from the perspective that Heidi has, but since I've had the opportunity to meet her family, I realize that she had the type of upbringing that enabled her to look at things in a much more healthy and balanced way.

I know that in this experience in Heidi's life, she has learned so many valuable lessons. I know that she has become more aware of the plight of abused children, and how desperately advocates are needed to speak for those who don't usually have a voice. I didn't know her before she came to WCCW, but because of her incarceration, I know that she will not be silent when another's life is in danger. She has taught me that it is always acceptable to be the best person that one can be.

Thank you for taking the time to consider what I have to say and if you have any questions or concerns please feel free to contact me at the above address.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Oh-yut-lah-mah Keating', written in a cursive style.

Oh-yut-lah-mah Keating

Exhibit F

10/26/2011

Dear Sir or Madame.

My name is Theresa Matheson and I am currently incarcerated at the Washington Corrections Center for Women (WCCW). I am writing concerning my friend and colleague Heidi Fero.

I first met Heidi at a *Toastmasters* meeting in 2006. We were both looking for ways to better communicate and were fortunate that the institution we were at offered *Toastmasters* as a programming opportunity. During this time, I had developed and was facilitating an orientation for women first arriving in prison called the *Mom's* group. The program had grown and we were looking for inmates that could effectively and compassionately convey the message of realistic hope to mothers who were incarcerated.

Heidi was submitted as a possible facilitator and was accepted in 2008. Heidi and I worked together not only in the *Mom's* group, but also co-facilitated the *Finding Your Voice* and *Create a New You* communication workshops. These workshops were created and facilitated by inmates for inmates, and focused on such topics as: self-esteem, active listening, dreams and goals, choosing and changing values, and recognizing anger styles.

Heidi was an engaged and valuable asset to our team from the start. She used her experience as a mother to help other mothers and offered vital contributions to the formation and implementation of the communication workshops.

I also had the great opportunity to work with Heidi developing and implementing the Women's Village at WCCW. We developed the concept and worked hard to create the organizational structure along with twelve other dynamic and passionate women. I have included some information about the Women's Village so you might better understand this exciting community building project we have undertaken.

I feel fortunate that Heidi has been apart of my life. She has exemplified to me how to be a better mother and a better person. She cares deeply for her family and for the families of others. She shows this caring in tangible ways as she leads the family support sub council through the Women's Village. Her creative leadership has enabled many families to connect in ways that would not have been possible without her.

I am honored to call Heidi my friend as I am sure are all who have been lucky enough to get to know her. I believe that Heidi has grown and changed during her time at WCCW. She has gained a better understanding of those who come from different backgrounds and embraces diversity in a new way. She has a compassion for disadvantaged populations and desires to foster change in her community upon her release. I know that Heidi needs to be with her family and I feel it is a gross miscarriage of justice that she is even incarcerated.

I hope this letter helps Heidi in some small way. Please feel free to contact me if I can assist in any further way.

Sincerely,

A handwritten signature in black ink, appearing to read 'Theresa Matheson', with a stylized, cursive script.

Theresa Matheson
#810424 KB24
9601 Bujacich Rd NW
Gig Harbor, WA 98332

Exhibit G

To whom it may concern: ... 06/15/11

I am writing this letter on behalf of my good friend Heidi Fero. I have had the pleasure of knowing Heidi for over 3 years and throughout that time she has shown herself to be an honest, dependable, creative, family-oriented, caring individual. She is calm even in the toughest of situations, and practical even when it seems like the world is falling apart.

Heidi regularly steps up to the plate when things need to get done. She will organize projects, find volunteers, and stay up all hours of the night to see it all to completion. If she says she's going to do something it inevitably gets done, most of the time exceptionally well. She doesn't complain about helping out, even when there is no compensation or even a pat on the back for her. She is truly a good human being in her heart, not just for show.

When it comes to being a parent, Heidi has not only devoted herself to truly staying connected with her children despite being incarcerated, but also to helping other women learn how to reach out to their own children and sustain the mother-child bond. She has often

given me advice and helped brainstorm ideas of how to connect with my daughter. Her dedication inspires so many to be better parents and not give up hope regardless of their circumstances.

I feel lucky to have met Heidi. My life has been changed for the better by all that we have shared. She is an extraordinary woman and mother, and sets a high example for all of us to live up to.

Sincerely,

Alyssa Knight

Exhibit H

Dear Whom it may concern:

June 19, 2011

My name is Marriam Oliver, currently incarcerated at WCCW. I'm writing this letter on behalf of Heidi Fero. In 2007 is when Heidi and I became acquainted with each other. Ever since, we have been very close friends, also former roommates. Being locked up for the past 10 years, there has been very few inmates that have made a huge impact on my life that way Heidi has. Heidi's passion, drive and determination are the first words best to describe Heidi as my first impression of her. The passion she has demonstrated to help the other mothers behind bars. Constantly giving them the encouragement to be an active role in their children's lives. Heidi is always putting her best foot forward to come up with new innovated ideas to help other mothers equip and prepare themselves while they are locked up and upon release. If there is a will or way to help mothers and children, trust and believe Heidi will find it to make things happens. Heidi's passion not only drives her to encourage other mothers, but make herself not only available to her friends, but any inmate that may need a "pick me up." I am always observing Heidi being kind and open-minded to people that would be avoided at all cost because they considered "different" than her typical set of friends. She will stand against her friends in the defense of what is right for all, which is; Treating others the way you would like to be treated- Respect. That's another great thing that I look up to Heidi about. She truly isn't a crowd follower, but clearly and positive role model. She stands strongly for her beliefs, even when she is standing alone. Heidi ceases to amaze me that she doesn't express any ill will against the justice system or the victim's family. Heidi continues to look at this journey as a way to find her purpose in life, than carry it out so this time locked up will not go in vain. It will be bittersweet to see Heidi leave, but the life changing impression she has made on my life will never be forgotten.

Sincerely,



Marriam Oliver

No. _____

COURT OF APPEALS, DIVISION II
OF THE STATE OF WASHINGTON

In re Personal Restraint Petition of
Heidi Charlene Fero

**DECLARATION OF
DR. JANICE OPHOVEN**

I, Dr. Janice Jean Ophoven, M.D., being competent to testify regarding the matters stated herein, declare under oath as follows:

1. I am a medical doctor and am board-certified in anatomic pathology and forensic pathology. During my nearly 40-year career as a doctor, I have served in numerous capacities in the field of forensic pathology, such as a medical examiner, medical director and forensic pathologist. I am currently an independent consultant providing forensic pathology services, focusing primarily on cases involving allegations of child abuse and neglect. I have a special interest and expertise in co-called “shaken baby syndrome” or “abusive head trauma” cases in which violent shaking is alleged to be the cause of serious injury or death of a child. A copy of my curriculum vitae, detailing my education, experience, publications, written and oral testimony and other pertinent qualifications is attached as Exhibit A.

2. I was retained in this case to review and analyze the materials provided, conduct research into the current state of medical knowledge regarding abusive head trauma/shaken baby syndrome, and to evaluate the medical testimony provided in Ms. Fero's trial in light of recent advances in medical knowledge regarding abusive head trauma/shaken baby syndrome. I reviewed the testimony of the medical experts during Ms. Fero's trial, as well as medical records provided by counsel.

3. Brynn Ackley was 1-½ years old when she arrived to hospital on January 7, 2002, unresponsive with evidence of complications of head injury. She was admitted with a diagnosis of nonaccidental injury and treated for left subdural hematoma, significant left to right shift and probable infarction of most of the left cerebral cortex. Multiple bruises to the face were noted and a non-displaced left tibial spiral fracture was documented. She was taken emergently to the OR for left craniotomy. Diffuse cerebral edema was present and retinal hemorrhages were noted.

4. I am familiar with the medical literature regarding abusive head trauma and shaken baby syndrome.

5. According to the testimony of the prosecution's medical experts at trial, an adult violently shook Brynn, causing Brynn's subdural hematoma, cerebral edema and retinal hemorrhages. Additionally, they testified that Brynn would have lost consciousness almost immediately after being

shaken; therefore, they concluded that Brynn was shaken shortly before 9 p.m., when Heidi Fero was the only adult in the house.

6. Based on the medical records, my review of the literature, and my experience as a pediatric forensic pathologist, and as explained more fully below, it is my opinion that much of the medical testimony presented during Ms. Fero's 2003 trial is no longer scientifically valid in light of recent advances in the medical community's understanding of the natural, accidental and non-accidental causes of cerebral edema, subdural hematoma and retinal hemorrhages.

7. Additionally, based on the above materials and my experience as a forensic pathologist, it is my opinion that Brynn suffered a traumatic brain injury, although it cannot be determined from the existing medical evidence whether the injury was accidental or non-accidental, or whether it was caused by an adult or a child. From the medical evidence, and as explained more fully below, it cannot be determined exactly when Brynn suffered her injuries. However, the conclusion offered by the prosecution experts at trial that Brynn suffered her injuries shortly before the 10 p.m. 911 call is not supported by current medical literature. It is more likely that Brynn suffered her injuries between 12 and 24 hours before she arrived at the hospital.

New Medical Literature Since the 2003 Trial

8. It is now generally accepted that a broad range of phenomena, including accidental falls from a very short height, could cause injuries like Brynn's. P. Barnes, *Imaging of Nonaccidental Injury and the Mimics: Issues and Controversies in the Era of Evidence-Based Medicine*, 49 RADIOLOGIC CLINICS OF N. AM. 205 (2011).

9. In fact, examples of similar injuries from short (30 inch) falls leading to injuries significantly worse than Brynn's exist in the literature. S. Denton & D. Mileusnic, *Delayed Sudden Death in an Infant Following an Accidental Fall: A Case Report with Review of the Literature*, 24 AM. J. FORENSIC MED. & PATHOLOGY 371 (2003). Particularly striking from that example is that the child appeared completely symptom-free for about 72 hours after the fall that led to his death.

10. Additionally, it is now generally accepted that a short fall, such as a fall from a chair, can cause cerebral edema, subdural hematoma and retinal hemorrhages. A child is more than capable of causing such injuries, and examples of children injuring other children (whether accidental or not) exist in the literature. GT Lueder *et al.*, *Perimacular Retinal Folds Simulating Nonaccidental Injury in an Infant*, 124 ARCH. OPHTHALMOLOGY 1782 (2006).

11. Finally, it is now generally accepted that a child can be lucid, and appear essentially symptom-free (at least to a layperson) for up to 72 hours

after suffering injuries that manifest as cerebral edema, subdural hematoma and retinal hemorrhages. K.B. Arbogast *et al.*, *Initial Neurologic Presentation in Young Children Sustaining Inflicted and Unintentional Fatal Head Injuries*, 116 PEDIATRICS 180 (2005).

12. In 2003, many medical professionals believed that if a child presented with a triad of symptoms, including cerebral edema, subdural hematoma and retinal hemorrhages, that was exclusively diagnostic of abuse by violently shaken. Although there was some controversy about the mechanism of injury—some studies suggested that shaking alone generated sufficient force to cause the injuries while others suggested that shaking alone was insufficient and that a concurrent impact was necessary—there was little dispute in the medical literature that either shaking alone, shaking plus impact, or major accidental trauma were the only causes of the triad of symptoms.

13. In fact, the American Academy of Pediatrics (“AAP”) issued a position paper in 2001 stated categorically that the “constellation” of injuries, meaning cerebral edema, subdural hematoma and retinal hemorrhages, “does not occur with short falls, seizures, or as a consequence of vaccination.” American Academy of Pediatrics, Committee on Child Abuse and Neglect, *Shaken Baby Syndrome: Rotational Cranial Injuries—Technical Report*, 108 PEDIATRICS 206-

210 (2001). Instead, the AAP stated that that the injuries were the result of such violent shaking “that individuals observing it would recognize it as dangerous and likely to kill the child.”

14. Also in 2001, the National Association of Medical Examiners (“NAME”), of which I am a member, issued a position paper stating that shaking caused diffuse axonal injury (which led to cerebral edema), subdural and subarachnoid hematoma or hemorrhages and retinal hemorrhages. That paper noted that “[s]tudies in children with nonaccidental head injuries also indicate that they show an immediate decrease in their level of consciousness at injury. Individuals sustaining diffuse brain injury of moderate to severe degree become symptomatic immediately.” M.E. Case *et al.*, *Position Paper on Fatal Abusive Head Injuries in Infants and Young Children*, 22 AM. J. FORENSIC MED. & PATHOLOGY 112-122 (2001).

15. In the 10 years since the AAP and NAME position papers were published, significant advances in the medical understanding of head trauma in children have cast significant doubt on the theory that shaking alone, or even shaking plus impact, causes cerebral edema, subdural hematoma and retinal hemorrhages. In 2009 AAP, noting that “advances in the understanding of the mechanisms and clinical spectrum of injury associated with abusive head trauma compel us to modify our terminology

to keep pace with our understanding of pathologic mechanisms,” issued a new paper that acknowledged that “mechanisms and resultant injuries of accidental and abusive head injury overlap” and that medical diseases can mimic the symptoms that AAP previously believed to be caused solely by violent shaking. American Academy of Pediatrics, Committee on Child Abuse and Neglect, *Abusive Head Trauma in Infants and Children*, 123 PEDIATRICS 1409-11 (2009).

16. Although “shaken baby syndrome” and “abusive head trauma” are medically-controversial terms, it is now generally accepted in the medical community that an ever-widening array of natural and accidental events can cause the symptoms once thought to be diagnostic of shaking baby syndrome. The causes of these injuries can be grouped into five categories: vascular, congenital, infections, metabolic and traumatic. For traumatic causes, it is now generally accepted that it is impossible to distinguish—based on the diagnostic triad—between traumatic injuries that were caused accidentally and those that were caused intentionally.

17. Additionally, each of the individual components of the diagnostic triad are much more strongly correlated with events other than shaking. For example, retinal hemorrhages have been recently observed in infants with meningitis. J.P. Lopez et al., *Severe Retinal Hemorrhages in Infants*

with Aggressive, Fatal Streptococcus Pneumoniae meningitis, 14 J. AM. ASSN. FOR PED. OPHTHALMOLOGY & STRABISMUS 97 (2010).

18. It is now generally accepted in the medical community that a child can have a lucid interval of up to 72 hours after suffering an injury that results in cerebral edema, subdural hematoma and retinal hemorrhages. The scientific explanation for a period of consciousness following head impact is related to complex intracranial physiology commonly referred to as intracranial equilibrium. Adjustments in intracranial pressure and volume occur over time to preserve normal circulation [perfusion] to the brain cells. When intracranial equilibrium fails, perfusion ceases, consciousness is lost, and cardiopulmonary collapse develops.

Brynn Ackley's Injuries

19. Nothing in the materials that I reviewed suggested that there were vascular, congenital, infectious or metabolic causes for the cerebral edema, subdural hematoma or the retinal hemorrhages that Brynn had on the night of January 7, 2003. However, I note that Brynn's treating physicians appear to have very quickly decided that Brynn was abused, and did not develop and perform differential diagnosis testing. Because her treating physicians did not perform diagnostic tests to rule out other potential causes of Brynn's symptoms it is not possible for me to assess whether any of them caused Brynn's symptoms. Therefore, my review

focused on whether there was any basis, in light of the whole medical record and current medical literature, to conclude that Brynn was violently shaken.

20. In my opinion, and in light of the recent medical literature, there is no scientific basis to conclude, to a reasonable degree of medical certainty, that Brynn was violently shaken. The medical record suggests that Brynn suffered a traumatic injury of uncertain origin, and it is impossible to tell when that injury occurred. However, the cerebral edema, subdural hematoma and retinal hemorrhages are consistent with the injuries that could occur from a short (less than 3 foot) fall or from injuries caused by a child. Moreover, the medical evidence and literature does not support the conclusion that Brynn was violently shaken.

21. In fact, because of the advanced state of the cerebral edema that Brynn presented with when she first arrived at the hospital, it is much more likely that she was injured more than 12 hours before arriving at the hospital. Theoretically the time window for Brynn's injury is as far out as 48-72 hours. There is no scientific evidence in this case to support the opinion that the injury occurred shortly before 911 was called.

22. The older shaken baby syndrome literature hypothesized, without supporting evidence, that shaking a small child caused severe rotational and acceleration/deceleration on the brain. It was believed that these

forces caused the brain to move around inside the skull, so much so that individual nerve cells tore. This injury, called Diffuse Axonal Injury (DAI), is often found in people that have suffered major trauma.

23. Recent medical literature shows that DAI is rarely, if ever, present in cases of non-accidental trauma in children. Instead, there is growing support for the hypothesis that lack of oxygen to the brain, or hypoxia/ischemia, is the mechanism for causing cerebral edema and not, as was asserted at trial, axonal shearing. Rather, it is the loss of oxygen to the brain and subsequent cell death. Recent medical literature suggests that this process takes well more than 12 hours to reach the levels observed in Brynn's first CT scan.

24. Based on the new medical evidence regarding lucid intervals and the mechanism and timing of the development of cerebral edema, I have concluded, to a reasonable degree of medical certainty, that Brynn was injured at least 12 hours before her first CT scan, which would have been before Brynn was dropped off at Heidi Fero's house. Moreover, the medical testimony in the trial of Heidi Fero is scientifically unsound. The medical evidence does not support the theory that Brynn was injured by "shaking", or that she was injured within an hour or two of being rushed to the hospital.

25. The new medical evidence presented above directly contradicts the positions of the prosecution's experts at trial. In my opinion, the opinions of Dr. Lukschu, Dr. Gorecki, Dr. Ockner, and Dr. Bennett are no longer generally accepted within the medical community.

26. According to the records I reviewed, Brynn began receiving medical care from paramedics at about 10 p.m. on January 7, 2002. She was transported to Southwest Medical Center. Brynn's condition at the time she began receiving care, but specifically at the time she arrived at Southwest Medical Center, is not consistent with an injury that occurred acutely in the preceding hour. When Brynn arrived at the hospital, she was in extreme decline. A CT scan conducted shortly after her arrival showed advanced edema, or brain swelling. It is clinically improbable that a child would have this degree of brain swelling from an injury occurring just an hour before, as claimed by the prosecution.

27. The medical evidence is also inconsistent with the manner of injury alleged by the prosecution. There were no signs that Brynn was tightly gripped by her shoulders or otherwise while being shaken, and no signs of whiplash or other neck injuries associated with rapid acceleration and deceleration. There has not been scientific/biomechanical evidence to verify that shaking a child Brynn's size and age could generate sufficient force to produce the medical findings in this case.

28. The trial testimony of the ophthalmologist, Dr. Shawn Goodman, was scientifically incorrect. Dr. Goodman testified that trauma is the only explanation for the hemorrhaging in Brynn's eyes. The actual mechanism for retinal hemorrhage is not understood and can occur in a variety of conditions. Years ago, the presence of retinal hemorrhages was thought to be a confirmatory finding for the theory of shaking as a cause of brain damage in child abuse cases. Unfortunately, this medical symptom was only associated with shaking in retrospect, and without a scientific basis.

29. Recent literature has called into question the use of this finding to support a theory of shaking. There is currently no scientific model to explain why retinal hemorrhages would or can be associated with abusive shaking. It is now well known that retinal hemorrhages are found in natural deaths, as well as accidental and nonaccidental deaths. Causes of retinal hemorrhages include coagulopathy (bleeding disorder), infection and increased intracranial pressure. Brynn's cerebral edema would have caused increased intracranial pressure, meaning that the retinal hemorrhages were a byproduct of Brynn's cerebral edema, not an independent injury diagnostic of child abuse. The intracranial pressure also would fully account for the intracranial bleeding.

30. The medical records establish that Brynn suffered from cerebral edema, potentially from lack of oxygen to the brain, or hypoxia. It is

worth noting that the old model used to explain how shaking damaged the brain – that the extreme acceleration and deceleration of the brain caused the axons of nerve cells to shear – is no longer generally accepted. Instead, some medical experts that continue to believe that shaking a child can cause cerebral edema believe that the shaking damages nerves in the neck that lead to the diaphragm. E.W. Matshes *et al.*, *Shaken Infants Die of Neck Trauma, Not of Brain Trauma*, 1 ACADEM. FORENSIC PATHOLOGY 1 (2011). The diaphragm controls breathing. The article proposes that the damaged nerves impair the child's ability to breathe, which cause a lack of oxygen (hypoxia) in the brain. Hypoxia is well known to lead to cerebral edema, but the mechanism operates much more slowly than diffuse axonal injury was thought to. It is noteworthy that over 40 years after “shaken baby syndrome” was first hypothesized, researchers are still struggling to identify the mechanism by which shaking an infant can cause cerebral edema, subdural hemorrhages and retinal hemorrhages.

31. Typically, brain swelling following serious brain damage peaks at 48 to 72 hours. Brynn already had significant brain swelling by the time she arrived at Southwest Medical Center. It is difficult to say whether her swelling was peaking when she was first examined, but in my opinion the amount of swelling indicates that whatever caused Brynn's cerebral edema

took place many hours, and perhaps days, before Brynn arrived at the hospital.

32. Based on the information provided, it does not appear that the medical providers involved in this case or those involved in determining the cause of Brynn's injuries made a serious effort to gather all of the pertinent information or create a differential diagnosis to explain the finding that Brynn was violently shaken. Instead, based on the testimony and reports of the medical providers, it appears that the providers concluded, shortly after Brynn arrived at the hospital, that she was the victim of child abuse. I found no evidence of any effort by any of the relevant medical professionals to create a differential diagnosis – a list of all potential causes supported by the information gathered – much less evidence of an attempt to do so before rendering opinions.

33. Findings in the case that I believe are very important to the forensic analysis include:

- a. History that Brynn was irritable, less active and had trouble walking when she arrived to Heidi's residence on January 7, 2002. These symptoms point to possible increased intracranial pressure.
- b. Several bruises were noted at bath time.

c. While Heidi was bathing her son, another child [Kaed, age 4 ½] had access to Brynn and may have been injuring Brynn. A four year-old toddler most certainly has the potential to cause serious injuries to a younger child.

34. The causes of brain damage, and specifically cerebral edema, can be grouped into five categories: vascular; congenital; infectious; metabolic; and traumatic. In this case, there was mainly evidence of traumatic injury, but I did not find any evidence that any of the other potential causes were explored. Because the medical professionals did not gather evidence regarding other potential causes and circumstances of Brynn's injuries, it is not possible at this time to prove or disprove that Brynn suffered from some non-traumatic condition that led to or exacerbated her brain injuries.

35. Based on the available medical information, it is my opinion that Brynn's injuries are consistent with hypoxic brain injury following accidental trauma. It is difficult to tell exactly when the trauma occurred, but the available medical evidence rules out the possibility that it occurred in the hour or two before Brynn arrived at Southwest Medical Center.

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DECLARED under penalty of perjury according to the laws of the State of

Washington, this 5th day of May, 2014, at

Minneapolis. Minnesota.


Dr. Janice Ophoven

EXHIBIT A

Janice Jean Ophoven, M.D.
Curriculum Vitae

Date and Place of Birth: January 21, 1947, Minneapolis, MN

Education:

Undergraduate Education:

1960-1964 Alexander Ramsey High School, Roseville, MN

1964-1969 BS - University of Minnesota, Minneapolis, MN

Medical Education:

1967-1971 MD - University of Minnesota, Minneapolis, MN

Post Graduate Education:

6/71-6/72 Internship, Department of Pediatrics, University of Minnesota,
Minneapolis, MN

7/75-6/76 Residency, Pediatrics, Department of Pediatrics, University of
Minnesota, Minneapolis MN

7/75-12/79 Residency, Anatomic Pathology, Department of Laboratory Medicine and
Pathology, Specialty Training – Pediatric Pathology, University of
Minnesota, Minneapolis, MN

1978-1979 Fellowship in Pediatric Pathology, University of Minnesota, and
Minneapolis Children's Medical Center, Minneapolis, MN

1/80-12/80 Fellowship in Forensic Pathology, Hennepin County Medical Examiner's
Office, Minneapolis, MN

Medical School Honors:

1971 Upjohn Award - Student most likely to make an important contribution to
medicine, awarded by faculty upon graduation.

1970-1971 Member of Disadvantaged Student Selection Committee.

1970-1971 Medical School Class Vice President.

Additional Training:

General Pediatrics internship and residency training, University of Minnesota

Medical Licensure:

Minnesota - 1974 to Present

Missouri - 1973 - 1974

Board Certification:

American Board of Pathology - 1981

American Board of Forensic Pathology - 1981

American Board of Quality Assurance and Utilization Review - 1988

Professional Experience:

- 1/81-present Independent Consultation in Pediatric Forensic Pathology
- 09/03-3/10 Forensic Pathologist, St. Louis County Medical Examiner's Office
Assistant Coroner / Medical Examiner
- 5/03- 10/12 Contract Forensic Pathologist, Minnesota Regional Coroner's Office
Assistant Coroner / Medical Examiner for the Counties of: Houston,
Carver, Chisago, Dakota, Fillmore, Goodhue, and Scott
- 6/91-2003 Principal consultant and owner, The Crackleberry Group (Healthcare
Consulting)
- 1/02-11/03 Forensic Pathologist, Midwest Forensic Pathology
Assistant Coroner for the Counties of: Anoka, Crow Wing, Meeker, Mille
Lacs and Wright
- 8/94-3/97 Vice President for Medical Policy, Allina Health Care
- 1/89-6/96 Medical Director of Quality Management, St. Paul Children's Hospital
- 5/89-1992 Deputy Medical Examiner, Hennepin County Medical Examiner's Office,
Minneapolis, MN
- 1/88-10/88 Director of Medical Review, Health Risk Management, Inc. (Managed
Health Care), Minneapolis, MN
- 4/85-6/88 Director, St. Paul Children's Hospital Laboratories, St. Paul, MN
- 1/81-3/85 Associate Director, St. Paul Children's Hospital Laboratories, St. Paul,
MN
- 1/80-12/80 Forensic Pathology Fellowship, Hennepin County Medical Examiner's
Office, Minneapolis, MN
- 7/75-12/79 Anatomic Pathology Residency, Department of Laboratory Medicine and
Pathology, Specialty Training - Pediatric Pathology, University of
Minnesota, Minneapolis, MN
- 7/75-6/76 Residency, Department of Pediatrics, University of Minnesota,
Minneapolis, MN
- 1/75-6/75 Private Practice, Group Health (Health Maintenance Organization)
Minneapolis/St. Paul, MN
- 1/73-9/74 Private Practice in Pediatrics, Sedalia, Missouri; also consultant for Rural
Health Care Delivery Program funded by American Academy of
Pediatrics

Memberships:

- Pediatric Pathology Society
- Ramsey County Medical Society
- Minnesota Medical Association
- American College of Physician Executives
- American Medical Association
- National Association of Medical Examiners
- American Academy of Forensic Sciences

Areas of Special Interest:

- Pediatric Forensic Pathology.
- Special areas of interest: MSBP, infanticide, infant apnea and suffocation, head injury / shaken infant.
- Changing Environment of Medical Care with Emphasis on Clinical Quality, Health Care Systems Analysis and Policy.
- Developmental and Gestational Pathology.
- Pediatric Laboratory Medicine.
- Pediatric Hematopathology.
- Pediatric Pulmonary Disease.

Appointments:

- Committee Member, MN Department of Health, Division of Family Health - *Infant Death Investigation Guidelines: To Investigate Sudden, Unexplained Deaths of Infants 0 – 24 months of Age. A Guide for Emergency Medical Services, Law Enforcement and Medical Examiners/Coroners.* Fall 2002
- Child Mortality Review Panel, Minnesota Department of Human Services. 1987 to 1999
- Co-chairman Guidelines Subcommittee Governor's Task on Violence. 1996
- Forensic Consultant to Midwest Resource Center for Child Abuse. 1987 to 1995
- Quality Assurance Director, St. Paul Children's Hospital, St. Paul, MN. 1982 to 1995
- Peer Review and Quality of Care Standards & Guidelines, Senior Consultant, Medicolegal Management, Morrison, CO. 1989 to 1994
- Pediatric Forensic Consultant and Deputy, Hennepin County Medical Examiner's Office, Minneapolis, MN. 1986 to 1994
- Executive Committee, Medical Staff, St. Paul Children's Hospital, St. Paul, MN. 1982 to 1994
- Invited member: Physician Advisor - PMDRG's National Association of Children's Hospitals and Related Institutions, Alexandria, Virginia. 1991 to 1992
- Ramsey County Medical Society Board of Trustees, Hospital Based Physician Representative. 1990 to 1992

- Physician Advisor Board and Physician Advisory Council on Quality. Health One (Hospital Management Corporation) Minneapolis, Minnesota. 1989 to 1991
- Invited member: Task Force on Quality Care and Invited member: Council on Research and Information, National Association of Children's Hospitals and Related Institutions, Alexandria, Virginia. 1989 to 1991
- Invited workshop participant: Special Issues of Child Abuse. Invited presentation: Identification of the Perpetrator in Child Abuse: The Medical Perspective. American Association of Forensic Scientists, National Meeting. Cincinnati, Ohio. February 1990
- Chair - Medical Services Committee, Ramsey County Medical Society. 1986 to 1988
- Board of Directors, Ramsey County Medical Society, St. Paul, MN. 1986 to 1988
- Practice Committee, Pediatric Pathology Society. 1986 to 1988
- Physician Coordinating Committee, Blue Cross and Blue Shield. 1986 to 1988
- Small Area Variations Advisory Committee, Blue Cross and Blue Shield. 1986 to 1988
- Medical Practices and Planning Committee, Minnesota Medical Association, 1984 to 1988
- Clinical Medical Director, St. Paul Children's Hospital, St. Paul, MN. 1982 to 1988
- Consultant and speaker for KTCA (public television) educational production, Newton's Apple. 1982 to 1988
- Clinical Assistant Professor, University of Minnesota, Department of Laboratory Medicine and Pathology. 1986
- Secretary and Board of Trustees Member, Minnesota Medical Association. 1986
- SGPCPC Perinatal Protocol Contributor. 1985 to 1986
- Regional Forensic Pathologist Representative to National Center for Missing and Exploited Children. 1984 to 1986
- Minnesota Society of Clinical Pathologists - Professional Relations Committee. 1984 to 1986
- Chairman of Minnesota Medical Association Subcommittee on Organ Transplantation. 1984 to 1986
- Consultant with Dr. Jocelyn Hicks for District of Columbia Hospital Re: Laboratory consolidation project with St. Christopher's Hospital, Philadelphia, PA. Spring 1985
- Executive Committee Member, Study Group of Complications of Perinatal Care, Pittsburgh, PA. 1984 to 1985
- Visiting Faculty to Mayo Clinic, Lectureship on Issues in Pediatric Laboratory Medicine. September, 1984

Research:

- Investigation of childhood injury and child abuse
- Physician Engagement and Participation in Health Care Redesign/Medical Reengineering. 1987 to present
- Nutritional Assessment of the Neonate. 1984 to 1989
- Histopathologic alterations of tracheobronchial respiratory epithelium in high frequency jet ventilation. 1983 to 1989
- Burroughs-Wellcome Exosurf project group: Tracheobronchiopulmonary Morphometric Analysis - Study Pulmonary Pathologist for 10 institutional protocol. 1987 to 1988
- Multifactorial computer analysis of histopathologic classification of lung tumors. Veterans Administration Hospital, Minneapolis, MN. Abstract presented IAP meetings February 1980. 1978 to 1980.
- Bile Acid Research, Gastroenterology Laboratory, University of Minnesota, Minneapolis, MN. June – September 1967; June – September 1968

Past Responsibilities:

- Principal and Chief Medical Officer of the Crackleberry Group. Independent consultants in Health Care: Credentialing, External Peer Review Design, Clinical Guidelines Development, Medical Staff Transformation, Process Reengineering, Conflict Management
- Vice President for Medical Policy, Allina Health Care System. Includes system wide health care policy strategies, credentialing, outcomes, guidelines, clinical process improvement, and physician participation in quality initiatives.
- Medical Director of Quality Management Department. Includes the development, coordination and management of quality assessment, utilization review and risk management of the Medical Services at St. Paul Children's Hospital.
- Management of laboratory services, consultation in pediatric laboratory medicine and pathology in private practice at a teaching pediatric hospital.
- Multiple hospital and organized medicine committee responsibilities with special interest in quality assessment and improvement.
- 24-hour hospital and Midwest Resource Center responsibilities for coordinating laboratory evaluation and directing documentation of child abuse and neglect.
- Teaching responsibilities including Phase D students and pediatric residents - a formal extension of the Hennepin County Medical Center Pathology, Ramsey County Medical Center Pathology and University of Minnesota Laboratory Medicine and Pathology training programs.
- Director of Medical Review at Health Risk Management, a full service company specializing in managing health care costs. Duties included: Recruiting, managing and training medical staff; criteria development; case management program development; Quality Assurance Development and Implementation; medical information resource development and dissemination.
- Assistant Coroner / Medical Examiner at Minnesota Regional Coroner's Office

Current Responsibilities:

- Consultation service in Forensic Pathology with emphasis on child abuse and neglect.
- Research and education in child abuse and neglect. Audiences to include physicians, clinical staff, local law enforcement, medical and legal groups.

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11. Georgieff M, Chockalingam U, Sasanow S, Gunter E, Murphy E, Ophoven J: The Effect of Antenatal Betamethasone on Cord Blood Concentrations of Retinol-Binding Protein, Transthyretin, Transferrin, Retinol and Vitamin E. *Journal of Pediatric Gastroenterology and Nutrition*. Accepted, August 1988.
12. Georgieff M, Amarnath U, Murphy E, Ophoven J: Serum Transferrin Levels in the Longitudinal Assessment of Protein-Energy Status in Preterm Infants. Submitted to the *Journal of Pediatric Gastroenterology*, January 1988.
13. Velasco A, Ophoven J, Priest J, Brennom W: Paratesticular Malignant Mesothelioma Associated with Abdominoscrotal Hydrocele. *Journal of Pediatric Surgery* 23:11 (1988) 1065-1067
14. Chockalingam U, Murphy E, Ophoven J, Weisdorf S, Georgieff M: Cord Transferrin and Ferritin Levels in Newborn Infants with Prenatal Uteroplacental Insufficiency and Chronic Hypoxia. *Journal of Pediatrics* 1987; 111:283-6
15. Mammel, Ophoven, Lewallen, Gordon, Sutton, Boros: High-frequency ventilation and tracheal injuries. *Pediatrics* 1986; 77:608.
16. Boros, Mammel, Lewallen, Coleman, Gordon, Ophoven: Necrotizing tracheobronchitis: A complication of high-frequency ventilation. *Journal of Pediatrics*, 1986.

17. Georgieff, Sasanow, Mammel, Ophoven, Pereira: Cord Pre-Albumin Values in Newborn Infants: Effect of Prenatal Steroids, Pulmonary Maturity and Size for Dates. *Journal of Pediatrics* 1986; 108:972-976.
18. Tilleli J, Ophoven J: Hyponatremic Seizures as a Presenting Symptom of Child Abuse. *Forensic Science International*. 30 (1986) 213-217.
19. Chockalingam U, Murphy E, Ophoven J, Georgieff M: The influence of gestational age, size for dates, and prenatal steroids on cord transferrin levels in newborn infants. *Journal of Pediatric Gastroenterology and Nutrition*. Accepted.
20. Georgieff M, Chockalingam U, Sasanow S, Gunter E, Murphy E, Ophoven J: The effect of antenatal betamethasone exposure on nutritional protein and fat-soluble vitamin levels in premature newborn infants. Submitted to *Lancet*.
21. Whitley C, Langer L, Ophoven J, Gilbert E, Gonzalez C, Mammel M, Coleman M, Rosenberg S, Rodrigues C, Sibley R, Horton W, Opitz J, Gorlin R: Fibrochondrogenesis: Lethal Autosomal Recessive Chondrodysplasia with Distinctive Cartilage Histopathology. *Amer J of Med Gen*, 1985; 19:265-275.
22. Boros, Mammel, Coleman, Lewallen, Gordon, Bing, Ophoven: Neonatal High-Frequency Ventilation: Four years experience. *Pediatrics* 1985; 75:657.
23. Ophoven, Boros, et. al. Tracheobronchial histopathology associated with high-frequency jet ventilation. *Critical Care Medicine*, July 1984; 12:829-832.
24. Gorlin, Langer, Ophoven, Gilber, Mammel, Coleman, Rosenbery, Rodrigues, Hirton, Opitz, Whitely: Fibrochondrogenesis: A Recently Recognized Chondrodysplasia. Presentation at American Society of Human Genetics - Virginia, 1983; *Am J Genetics* 35:91A, 1983.
25. Mayer JE, Ewing SL, Ophoven J, Sumner HW, Humphrey EW: Influence of histologic type of survival after curative resection for unidentified lung cancer. *Journal Thoracic and Cardiovascular Surgery*. 1982; 84:641.
26. Ophoven J: Infectious mononucleosis: Part 2. Serologic Aspects. *Lab Med* 1979; 10:203.
27. Dehner LP, Sibley RK, Sauk JJ Jr., Vickers RA, Nesbit ME, Leonard AS, Waite DE, Neeley JE, Ophoven J: Malignant melanotic neuroectodermal tumor of infancy. A Clinical, pathologic ultrastructural and tissue culture study. *Cancer* 1979; 43:1389-1410.

Abstracts & Presentation:

1. OCDLA Seminar, "Child Maltreatment in SBS Cases and the Medical Examiner's Perspective," Norman, OK., June 23, 2011
2. CHU National Conference, "Infant Death Investigation-The Forensic Pathologist's Perspective," April 7, 2011
3. California Death Penalty Seminar, "Child Victims in Homicide and Sexual Assaults," Monterey, CA., February 19, 2010
4. New Jersey Public Defenders, "How to Review Forensic Evidence in a Child Case," Trenton, NJ., June 3, 2010
5. Alabama Criminal Defense Lawyers Association, "New Developments in SBS and Head Trauma," Birmingham, AL., January 30, 2009
6. CPDA Seminar, "Medical Evidence and Child Sexual Misuse," Palm Springs, CA, December 5, 2008
7. Sixth Annual Crown Defense Conference, "Child Abuse Investigations: A Pathologist's Approach" September 18, 2008

8. Alabama Criminal Defense Lawyer's Association, "Child Sex Abuse: Pediatric Forensics" June 21, 2008
9. California Public Defender's Association, "Medical Examinations/Medical Evidence in Sexual Assault" December 01, 2007
10. National Criminal Defense Lawyer's Association. "Issues in Child Sexual Misuse" August 03, 2007
11. Annual EBMS Meeting. "Forensic Pediatric Pathology – Case Review in Traumatic Brain Injury" May 11, 2007
12. Texas Criminal Defense Lawyer's Association. "Understanding the Scientific Evidence in Sexual Homicides" September 20, 2006
13. Public Defenders of Dakota County. "The Forensic Autopsy Report – A Navigator's Perspective." August 04, 2006
14. CACJ/CPDA Capital Case Defense Seminar. "Scientific Evidence in Sexual Homicides" February 19, 2006
15. University of San Diego School of Law. "Investigate your Case; CSI for Lawyers...Childhood Injuries" January 28, 2006
16. Iowa Public Defender Agency. "An Approach to Sexual Injury Physiology" June 22, 2005
17. Iowa Public Defender Agency. "Head Injuries in Childhood; An Evolving Challenge" June 22, 2005
18. North Memorial Hospital: Long Hot Summer Conference. "Unexpected Child and Infant Death: Is It Always Abuse?" March 5, 2005.
19. CACJ/CPDA Capital Case Defense Seminar. "Scientific Evidence in Sexual Crimes." February 20, 2005.
20. CACJ/CPDA Capital Case Defense Seminar. "Head Injuries in Childhood: An Involving Challenge." February 19, 2005.
21. Minnesota Bureau of Criminal Apprehension Training and Development – Death Scene Investigation. "Basics of Child Abuse and Infant Deaths." February 3, 2005.
22. California Public Defender Agency Sexual Crimes Seminar. "Understanding Child-Victim Physiology." October 23, 2004.
23. Minnesota Division International Association for Identification. "Childhood Death Investigation: Unexpected/Unexplained Childhood Deaths." September 16, 2004.
24. St. Louis County Medical Examiner's Office. "Childhood Death Investigation: Unexpected/Unexplained Childhood Deaths." March 8, 2004.
25. CACJ/CPDA Capital Case Defense Seminar. "Head Injuries in Childhood: An Evolving Challenge." February 14, 2004.
26. MN Women Physicians' Retreat. "The Child and Forensic Medicine: A reflection on children in crisis." Co-presented with Susan Roe, MD. October 4, 2003.
27. MN Bureau of Criminal Apprehension. Child Abuse Investigation. "Forensic Pathology of Child Abuse." April 16, 2003
28. 6th Annual LaCrosse Children Maltreatment Conference. "Trauma and the Abused Child" and "Munchausen Syndrome by Proxy." April 4, 2003.
29. Chippewa Valley Technical College Investigators' Annual In-service. "Child Abuse and Neglect" presented by Janice Ophoven, MD and Susan Roe, MD. December 12, 2002.

30. South Carolina State Child Fatality Advisory Committee. Child Fatality Conference - Investigating and Prosecuting Fatal Child Maltreatment. "Forensic Pediatric Autopsy." September 25, 2002
31. Midwest Forensic Pathology. Forensic Nursing III. "Overview of Child Abuse, Vulnerable Adult Abuse, and Domestic Violence." February 28, 2002; May 24, 2002
32. MN Bureau of Criminal Apprehension. Child Abuse Investigation. "Forensic Pathology of Child Abuse." April 17, 2002
33. MN Forensic Pathology, PA. 3rd Annual All Deputy Coroner Meeting. "Munchausen Syndrome by Proxy." April 6, 2002
34. MN Bureau of Criminal Apprehension. Death Scene Investigation Training and Development. "Identifying the Details: Shaken Baby Syndrome and Munchausen Syndrome by Proxy." February 5, 2002
35. Stearns Benton County Child Protection Agency. "Shaken Baby Syndrome - Challenges and Implications." April 27, 2001
36. St. Cloud Hospital. Physicians' Forum. "Shaken Baby Syndrome." March 2, 2001
37. Partners Healthcare Consulting. "Moving into the Driver's Seat – Physician's Guide to Controlling their Future." Invited speaker: "Navigating the Road to Effective Care Management." October 5, 2000
38. MN Bureau of Criminal Apprehension and Ramsey County Medical Examiners' Office. Midwest Homicide Investigative Conference. "A Practical Approach to the Investigation of Child Abuse Homicide." September 7, 2000
39. Niagara County Child Fatality Team Training. Keynote Presentation. "The Investigation of Fatal Child Abuse from the Medical Perspective." June 20, 2000
40. The Alaska Academy of Trial Lawyers 4th Annual Litigators' Conference. "Science and the Law – Out of the 'Frye'ing Pan." April 2000
41. South Carolina Law Enforcement Division. "The Investigation of Fatal Child Abuse from the Medical Perspective." October 1999.
42. Minnesota Bureau of Criminal Apprehension, Child Abuse II Seminar, May 1999.
43. Invited Speaker *Health Care Forum, Managing Change* October 1997.
44. Invited Speaker *Masters 7 Conference for Advanced Death Investigation, Munchausen's Syndrome by Proxy*, St. Louis, MO. July 1997.
45. IHI Workshop with B. Bushick MD, Measurement and Integrated Health Care Systems, workshop presentation, December 1995.
46. The Investigation of Infant Deaths: An Interdisciplinary Symposium, "Coroners / Medical Examiners and Pathologists: Bridging the Roles", June, September 1994
47. Women in Medicine: Finding a Balance - invited keynote speaker and workshop presentations, Breckenridge Colorado, August 1994
48. BCA Law Enforcement Training Seminar, Forensic Issues in Child Abuse, Spring 1994, St. Cloud, MN
49. Development and presentation of three-day workshop with focus on responsibilities in data management and credentialing. Medical Staff Transformation, Middletown Regional Hospital, Middletown, Ohio, March 1994
50. Design and Focus External Peer Review with Medical-Legal Management Inc. 1985-to 1994

Evansville, Indiana

Jacksonville, Florida
Boston, Mass.
Amarillo, Austin, Fort Worth, Texas
St. Jose, California

51. Invited Participant, Minnesota Bar Association Annual Trial Lawyer Course, Expert Witness. Bemidji, MN. 1986, 1987, 1988, 1992, 1993, 1994
52. ATLA National Conference - The Catastrophically Injured Infant, Nov 13-14, 1993, Reframing the Causation Issue into a Forensic Context, Atlanta, GA
53. California Ambulatory Surgery Association Research Group, Model for Clinical Guidelines - Best of Practice Model, Lake Tahoe, Fall 1993
54. Colorado Medical Society Woman's Section, The Role of Fear in Health Care Politics, Fall 1993, Snowmass, CO
55. Alaska Trial Lawyers Association, Annual Meeting, full day workshop on Medical Legal issues in Child Abuse, Fall 1993, Anchorage Alaska
56. APQC [American Productivity and Quality Center] "Achieving Results Through Benchmarking" - Benchmarking Week - May 19, 1993, Washington, DC. *Developing "State of the Art" Guidelines for Pediatric Care*
57. Sixth Annual John I. Coe Symposium, Placental and Perinatal Pathology, April 16, 1993, Forensic Issues in Perinatal Medicine Minneapolis, MN
58. Quality Challenge Award Recipients on behalf of the Children's Hospital of St. Paul, MedisGroups National Meeting, April 1993, Washington, DC
59. MediQual National Symposium "Insight", Spring 1993, Washington DC, 2 workshops *MedisGroups and Clinical Guidelines The National Pediatric Network*
60. Development and Implementation - 2 day Clinical Guidelines Exercise, Presbyterian St. Luke's Hospital, Denver Colorado, 1993
61. Multiple Medical Staff Seminars / Presentations on MedisGroups and Health Care Quality including Alliant Health Care Systems, Louisville, KY 1993
62. National Association of Medical Examiners Annual Conference, Milwaukee, WI, Forensic issues in Child Abuse, A Review, Fall 1992
63. Wisconsin Children's Hospital, Annual Retreat, Full day workshop on Medical Staff Transformation, Fall 1992
64. MediQual National Symposium, April 1992, Workshop, Recruiting Physician Participation in Data Management and Clinical Guidelines, Spring 1992, Saddlebrook, Florida
65. Quality Assurance in Anatomic Pathology, Lab Medicine and Pathology Grand Rounds, University of Minnesota, 1992
66. MediQual National Symposium, Spring 1991, Data and Peer Review, Hilton Head, SC
67. Invited Workshop Presentation: Pediatric Forensic Pathology: Wisconsin State Death Investigators Course. Sponsored by the Milwaukee County Medical Examiner, Milwaukee, Wisconsin. Fall 1990
68. Invited Workshop Presentation: Pediatric Forensic Pathology Issues. Sponsored by LCM Laboratories. Sioux Falls, SD. April 1990
69. Invited workshop participant: Special Issues of Child Abuse. Invited presentation: Identification of the Perpetrator in Child Abuse: The Medical Perspective. American Association of Forensic Scientists, National Meeting. Cincinnati, Ohio. February 13, 1990.

70. Invited Workshop Presentation. Pediatric Forensic Pathology at the American Academy of Pediatrics, Orlando, Florida, March 14, 1989.
71. Invited Workshop Presentation, Pediatric Forensic Pathology at the Society for Pediatric Pathology, San Francisco, California, March 5, 1989.
72. Invited Workshop Presentation, Pediatric Forensic Pathology at the Society for Pediatric Pathology, Washington, D.C., February 1988.
73. Georgieff M, Amarnath U, Landon M, Mills M, Ophoven J: Newborn Iron Status of Infants of Diabetic Mothers (IDMS). Ped Res. Submitted and Accepted, December 1987.
74. Chockalingam U, Murphy E, Ophoven J, Georgieff M: Transferrin (TF) and Ferritin (FE) as Markers of Uteroplacental Insufficiency (UPI) in Newborn Infants. Ped Res Submitted Nov 1986. Published April 1987.
75. Chockalingam U, Murphy E, Ophoven J, Georgieff M: Decreased Iron Status in Symptomatic Large-for-Gestational Age (LGA) Infants. Ped Res Submitted Nov 1986. Published April 1987.
76. Georgieff M, Chockalingam U, Murphy E, Ophoven J: Effects of Short and Long-term Prenatal Steroids on Nutritional Proteins in Premature Neonates. Accepted for presentation and published, April 1987.
77. Chockalingam U, Murphy E, Ophoven J, Georgieff M: The Influence of Perinatal Asphyxia on Rapid-turnover Proteins in Newborn Infants. Ped Res Submitted Nov 1986. Published April 1987.
78. Chockalingam U, Murphy E, Ophoven J, Georgieff M: Effects of Short and Long-term Prenatal Steroids on Nutritional Proteins in Premature Neonates. AACC Submitted and Accepted, January, 1987.
79. Chockalingam U, Murphy E, Ophoven J, Georgieff M: Cord Transferrin (TF) and Ferritin (FE) as Markers of Uteroplacental Insufficiency (UPI) in Newborn Infants. AACC Submitted and Accepted, January 1987.
80. Chockalingam U, Murphy E, Ophoven J, Georgieff M: Rapid-Turnover Serum Proteins (RTP) to Evaluate Protein Status of Preterm Infants. AACC Submitted and Accepted, January, 1987.
81. Chockalingam U, Murphy E, Ophoven J, Georgieff M: Association of Decreased Ferritin Levels to Hypoglycemia in Large-for-Gestational Age Infants. American College of Nutrition 28th Annual Meeting. Submitted to Blood, 1987.
82. Mammel M, Ophoven J, Gordon M, Taylor S, Boros S: Tracheal Injury Following High-frequency Oscillation in Laboratory Animals. Ped Res Submitted November 1986.
83. Chockalingam, Murphy, Ophoven, Georgieff: The Affect of Gestation Age Size for Dates and Prenatal Steroids on Cord Transferrin Levels in Preterm and Term Infants. Submitted to the 27th Annual American Nutritional College Meeting, September 1986. Accepted.
84. Chockalingam, Murphy, Ophoven, Georgieff: Influence of Preneonatal Steroids on Nutritional Markers in Premature Infants: Submitted to the 27th Annual American Nutritional College Meeting September 1986. Accepted.
85. Invited Course Participant. University of Indiana: Issues in Child Abuse and Neglect. Indianapolis, Indiana 1986.
86. Georgieff, Sasanow, Mammel, Ophoven, Periera: Prenatal Steroids and Lung Maturity and Size for Dates Affect Neonatal Prealbumin Levels. Ped Res 20; 4(1986) 138A.
87. Georgieff, Sasanow, Mammel, Ophoven, Periera: Prenatal Steroid Administration Enhances Liver Protein Synthesis in Preterm Neonates. Clin res 3; 1(1986) 138A.

88. Invited Speaker, American Academy of Forensic Sciences Workshop on Sexual Abuse in Children, 1986.
89. Mammel M, Ophoven J, Gordon M, Sutton M, Boros S: Proximal Tracheal Inflammation with Three Different High-frequency Ventilators. Clin Res 1985; 33:148A.
90. Lewallen P, Boros S, Mammel M, Coleman M, Ophoven J: Neonatal High-frequency Jet Ventilation: Benefits and Risks. Clin Res 1985; 33:148A.
91. Ophoven J, Tilelli J: Abstract: Hyponatremic Seizures as a Presenting Symptom of Child Abuse. Presented to Conference on Forensic Pediatric Pathology. June, 1985.
92. Ophoven J, Leverone J, Moen T: Abstract: Congenital Idiopathic Subglottic Stenosis Presenting as Sudden Infant Death Syndrome. Presented to Conference on Forensic Pediatric Pathology. June 1985.
93. Invited Workshop Participant. American Academy of Forensic Sciences; Child Sexual Abuse. New Orleans, 1985.
94. Ophoven J, Mammel M, Coleman M, Boros S: Necrotizing Tracheobronchitis; A New Complication of Neonatal Mechanical Ventilation. Laboratory Investigations vol. 52, 49A 1985. Presentation at IAP Meetings, 1985.
95. Lectureship on Issues in Pediatric Laboratory Medicine. Mayo Clinic September, 1984
96. Lewallen P, Boros S, Mammel M, Coleman M, Ophoven J: Neonatal High-frequency Jet Ventilation: Four Years Experience. Clin Res 1984; 32:814A.
97. Mammel M, Ophoven J, Gordon M, Sutton M, Boros S: High-frequency Ventilation Produces Inflammatory Injuries in the Proximal Trachea. Clin Res 1984; 32:815A.
98. Dehner, Ophoven, et. al.: Unusual Presentation of Childhood Rhabdomyosarcoma. Presented at Pediatric Pathology Meetings. February 1983.
99. Ophoven J, Mammel M, Gordon M, Boros S: High-frequency Jet Ventilation: Tracheobronchial Histopathology. Clin Res 1983; 31: 142A.
100. Ophoven J, Mammel M, Gordon M, Boros S: High-frequency Jet Ventilation: Tracheobronchial Histopathology. Pediatr Res 1983; 17: 386A.

No. _____

COURT OF APPEALS, DIVISION II
OF THE STATE OF WASHINGTON

In re Personal Restraint Petition of
Heidi Charlene Fero

**DECLARATION OF
DR. PATRICK BARNES**

I, Dr. Patrick David Barnes, M.D., being competent to testify regarding the matters stated herein, declare under oath as follows:

1. I am a pediatric neuroradiologist and am board certified in Diagnostic Radiology and Neuroradiology. A pediatric neuroradiologist specializes in the use of x-rays, computerized tomography (CT), magnetic resonance imaging (MRI), and other radiological techniques to diagnose diseases and conditions of the central nervous system, neck, or head in children and infants. I am a Professor of Radiology at Stanford University Medical Center and Chief of Pediatric Neuroradiology and Medical Director of the MRI/CT Center at the Lucile Salter Packard Children's Hospital. I have practiced and taught on head injury in children for thirty five years, and have published over one hundred articles, reviews, and

book chapters on this subject. My curriculum vitae is attached as Exhibit A.

2. I was retained in this case to review and analyze the materials provided, conduct research into the current state of medical knowledge regarding “shaken baby syndrome,” and to evaluate the medical testimony in Heidi Fero’s trial in light of recent advances in medical knowledge regarding shaken baby syndrome.

3. I am a past member of the Child Abuse Task Force, Society for Pediatric Radiology, and was Chair of the Task Force from 2007-2008. I am also co-founder of the Child Abuse Task Force and a member of the child abuse SCAN team for the Lucile Packard Children’s Hospital, Stanford University Medical Center and Santa Clara Valley Medical Center.

4. In addition to my teaching and research responsibilities, I review approximately 20 CT scans and MRIs a day. After reviewing the images, I provide the radiology findings and a differential diagnosis, *i.e.*, possible causes for the findings, to the treating doctors. In cases involving possible child abuse, these findings are correlated with the laboratory tests, medical records and caretaker and investigator reports in order to distinguish between accidental trauma, non-accidental trauma, and natural causes.

5. Since Heidi Fero's trial, the differential diagnoses, or assessment of alternative explanations, for radiological findings previously associated with non-accidental pediatric head trauma have greatly expanded and now include a variety of accidental and natural causes. The application of evidence-based medicine has further established that the scientific basis for shaken baby syndrome and similar diagnoses is very limited. Some of the basic tenants of these diagnoses have been disproven by research in biomechanics, neuropathology, and radiology.

6. Also since Ms. Fero's trial, research has established that children who suffer trauma, whether accidental or non-accidental in origin, have a significant chance of remaining lucid (conscious and aware) for extended periods of time—up to 3 days or more—after suffering trauma.

7. The opinions I express herein are held to a reasonable degree of medical certainty, based on the medical record provided to me by counsel, and are based on my clinical, teaching, and research experience in pediatric neuroradiology over the past thirty years.

Evolution in Understanding Pediatric Head Injury

8. Over the past decade, many longstanding beliefs on pediatric head injury (including shaken baby syndrome) have been disproven, and alternative causes for findings previously attributed to abuse have been identified. We also learned that it is not possible to time injuries as

precisely as previously believed. I recently published, with several others, a summary of the evolution in thinking on shaken baby syndrome, which is now called abusive head trauma. Keith A. Findley, Patrick D. Barnes, David A. Moran & Waney Squier, *Shaken Baby Syndrome, Abusive Head Trauma, and Actual Innocence: Getting it Right*, 12 HOUS. J. HEALTH L. & POLICY 209 (2012).

9. Shaken baby syndrome is a hypothesis first advanced by Dr. John Caffey in 1946, and that gained traction in the early 1970s as a way to explain three conditions (subdural hemorrhage or subarachnoid hemorrhage, retinal hemorrhage and brain swelling) in children who showed no signs of external head injury. By the late 1990s, pediatric head-injury literature consisted primarily of pediatric and pediatric radiology articles that considered the "triad"—subdural or other hemorrhages within the skull or brain, retinal hemorrhages and brain swelling—to be pathognomonic for shaken baby syndrome. Pathognomonic means that particular symptoms are unique to a particular disease or condition and can reliably support the diagnosis. The theory was that shaking caused subdural or subarachnoid hemorrhage by rupturing the bridging veins between the brain and saggital sinus, and caused traumatic injury to the axons in the brain (called diffuse axonal

injury, or DAI). DAI purportedly caused swelling of the brain (cerebral edema).

10. By the late 1990s, this theory was virtually universally accepted by the medical community, including my own practice, and it was relatively uncommon for physicians and scientists to question it. Based on this theory, I wrote many articles in support of shaken baby syndrome and often testified for the prosecution. In 1997, I was the pediatric neuroradiology expert for the prosecution in the Boston "nanny" case, in which Louise Woodward was convicted of causing Matthew Eappen's death by shaking. In 1998, I co-authored the chapter on head injury in *Imaging of Child Abuse* (PK Kleinman, ed., 2d ed. 1998), a standard text on this subject. In preparing the chapter, we reviewed the literature but did not assess the quality of the evidence.

11. During this period, doctors routinely testified that the force necessary to cause a subdural or subarachnoid hemorrhage in an infant or child was equivalent to the force from a high speed motor vehicle accident or a fall from a multi-story building. Since then, several literature reviews have established that there is no scientific or evidentiary basis for this testimony.

12. Over the past decade, many doctors—including myself—have changed their testimony and beliefs to bring them into accord with the

scientific evidence and standards of evidence-based medicine. In this affidavit, I provide a brief overview of the developments in this area. My articles contain more extensive discussions and citations to the relevant literature.

13. I have testified on many occasions. Earlier in my career, I primarily testified as a fact witness or expert witness for the prosecution, as I did in the Woodward case. However, most of my recent expert testimony has been on behalf of defendants accused of abusing children. For example, I offered testimony in the *Edmunds* case in Wisconsin, in which Audrey Edmunds was granted a new trial based in part on my testimony regarding advances in medical research since her original trial. The opinions I offered in that case are consistent with the opinions I offer here.

New Research on Pediatric Head Injury

14. Much of the progress in this field has been based on the advent of evidence-based medicine, which is now the established standard in medicine. In evidence-based medicine, all practices and diagnoses are reviewed for quality of evidence. To do this, the medical literature is categorized based on its scientific methodology and biostatistical significance.

15. To support a standard or guideline, the quality of the evidence must fall within Levels I or II. Level I requires research with control groups and appropriate statistical analysis and seeks to establish a 95% level of certainty. Level II requires a somewhat lower level of proof. Levels III and IV consist largely of opinion articles and hypotheses. While these materials may be useful, their limitations must be clearly understood and disclaimers on the quality of evidence provided, particularly if used in diagnosis or courtroom testimony.

16. The advent of evidence-based medicine has had a profound impact on the diagnosis of pediatric head injury. Since 1998, I have served on two panels that have assigned quality of evidence ratings to over a hundred articles in the area of injury to the immature brain. One panel addressed head trauma in children under two years of age; the other addressed fetal and neonatal brain injury. Similar reviews have found that there was no evidence base for much of the child abuse literature, and that there was an urgent need to bring this literature, which had remained essentially unchanged for decades, into conformity with other areas of medicine, which have become increasingly research-based and scientific.

17. The first major evidence-based review of the literature on shaken baby syndrome ranked the literature from the 1960s through 1998 based on the standards of evidence-based medicine. Mark Donohoe, Evidence-

Based Medicine and Shaken Baby Syndrome: Part I: Literature Review, 1966-1998, 24 AM. J. FORENSIC MED. PATHOL. 239-42 (Sep. 2003). None of the articles reviewed for that study rose above Level III, with most falling in Level IV (that is, the articles were opinion pieces and hypotheses).

18. The review characterized the evidence as analogous to an inverted pyramid, with a small data base consisting largely of poor quality research, retrospective in nature and without appropriate controls, spreading to a broad body of somewhat divergent opinions. The review concluded that there was no support in the literature for the commonly held opinion that subdural and retinal hemorrhages in an infant were strong evidence of shaken baby syndrome.

19. In 2004, Dr. Patrick Lantz published a case report and literature review on retinal hemorrhages. The case report described an accidental crush injury that produced findings previously viewed as pathognomonic of shaken baby syndrome. After reviewing the literature on retinal hemorrhages, Dr. Lantz concluded that the literature does not provide evidence-based support for the conclusion that particular retinal findings are specific for shaken baby syndrome or child abuse. P .E. Lantz *et al.*, *Perimacular Retinal Folds from Childhood Head Trauma*, 328 BRIT. MED. J. 754 (2004). Since then, Dr. Lantz has reported that retinal

hemorrhages are found at autopsy in a wide range of natural and accidental deaths.

20. As various reviews have noted, much of the earlier literature on non-accidental head injury in children was based on circular reasoning. Since the triad (subdural hemorrhage, retinal hemorrhage and brain swelling) was considered to be pathognomonic of child abuse, a child who presented with the triad (or sometimes with a portion of the triad) was automatically classified as "shaken" or "abused." These diagnoses were then used to validate the theory and to diagnose other "shaken" or "abused" children. Once this circularity is removed, the lack of an evidence base is apparent.

21. Although it has been known that many conditions, including dehydration, whooping cough, and glutaric aciduria (type I), can cause subdural hemorrhage, doctors have often diagnosed shaken baby syndrome or abusive head trauma with little further inquiry into the child's symptoms, history, or laboratory reports. In many cases, subsequent reviews establish that the child's collapse was preceded by illness, infection, respiratory distress, airway obstruction, birth injuries, or accidental trauma that would explain the findings.

22. As it became increasingly clear that there was little or no evidence base for shaken baby syndrome and similar theories, the medical

profession began looking outside the child abuse literature to the literature in other fields, including biomechanics (effect of physical forces on the human body), brain findings (neurosurgery, neurology, neuroradiology and neuropathology), and forensic pathology (cause and manner of disease and/or death). Some of this literature was available before Ms. Fero's trial, but it was not widely read or applied by clinicians or child protection teams. As a practical matter, it is very difficult to review or keep up with the research in these specialties, particularly since the research often precedes the published literature by some years.

23. Since it is not possible to summarize the advances in the literature in these areas in a single affidavit, I will provide a brief summary by category.

Biomechanical Literature

24. In 1987, the classic biomechanical study on shaken baby syndrome concluded that shaking does not generate sufficient force to create a subdural hemorrhage under established injury thresholds, and that the force from impact—even on soft surfaces—was approximately 50 times the force from shaking. The authors therefore suggested that the syndrome might be more accurately characterized as "shaken-impact" syndrome.

A.C. Duhaime *et al.*, *The Shaken Baby Syndrome, a Clinical, Pathological, and Biomechanical Study*, 66 J. NEUROSURGERY 409 (1987).

25. Recent research has confirmed that short falls can cause the findings previously associated with abuse and that shaking would cause serious neck injury before it created subdural hemorrhages. J. Plunkett, *Fatal Pediatric Head Injuries Caused by Short-Distance Falls*, 22 AM. J. FORENSIC MED PATHOLOGY 1 (2001); A.K. Ommaya *et al.*, *Biomechanics and Neuropathology of Adult and Pediatric Head Injury*, 16 BRIT. J. NEUROSURGERY 220 (2002); M.T. Prange *et al.*, *Anthropomorphic Simulations of Falls, Shakes, and Inflicted Impacts in Infants*, 99 J. NEUROSURGERY 143 (2003); W. Goldsmith & J. Plunkett, *A Biomechanical Analysis of the Causes of Traumatic Brain Injury in Infants and Children*, 25 AM J. FORENSIC MED. PATHOLOGY 89 (2004); F. Bandak, *Shaken Baby Syndrome: A Biomechanics Analysis of Injury Mechanisms*, 151 FORENSIC SCI. INT'L 71 (2005).

26. While the biomechanical research is sometimes criticized on the ground that it is not possible to conduct experiments using live babies, this research uses the same techniques (animal tests, crash dummies, and computer simulations) used to set safety standards for car seats and play equipment. It would therefore receive a higher evidence-based ranking than the literature on shaking.

Neuropathology Literature

27. Shaken baby syndrome was based on the belief that shaking caused traumatic injury to the axons throughout the brain (known as diffuse axonal injury, or DAI). However, the first reliable evidence-based neuropathology studies on abusive head trauma found that the brains of children who were reportedly shaken or intentionally injured did not show traumatic DAI. Instead, these brains showed hypoxic-ischemic axonal injury, or lack of oxygen to the brain (i.e. hypoxic-ischemic DAI). J.F. Geddes *et al.*, *Neuropathology of Inflicted Head Injury in Children I: Patterns of Brain Damage*, 124 BRAIN 1290 (2001); J.F. Geddes *et al.*, *Neuropathology of Inflicted Head Injury in Children II: Microscopic Brain Injury in Infants*, 124 Brain 1299 (2001).

28. Dr. Geddes also found that the thin subdural hemorrhages often found in allegedly abused children were similar to those found in fetuses or newborns who died natural deaths, suggesting that there are nontraumatic causes for such findings. J.F. Geddes *et al.*, *Dural Hemorrhage in Non-traumatic Infant Deaths: Does it Explain the Bleeding in "Shaken Baby Syndrome"?*, 29 NEUROPATHOLOGY & APPL. NEUROBIOLOGY 114 (2003).

29. Noting that whooping cough had traditionally been associated with subdural hemorrhage, Dr. Geddes and Dr. Talbert, a biomechanical engineer, later used computer simulations and whooping cough records to

confirm that paroxysmal coughing can cause subdural hemorrhages. J.F. Geddes and D.G. Talbert, *Paroxysmal Coughing, Subdural and Retinal Bleeding: A Computer Modeling Approach*, 32 NEUROPATHOLOGY & APPL. NEUROBIOLOGY 625 (2006).

Ophthalmology Literature

30. Ophthalmologists and other doctors sometimes testify that retinal hemorrhages, or certain types of retinal hemorrhages, are characteristic or even pathognomonic of shaken baby syndrome. There is no evidence-based research for these theories. Since the retina and its coverings are extensions of the brain and the dura, the differential diagnosis for retinal hemorrhages is similar to the differential diagnosis for subdural hemorrhages, and includes a wide array of natural and accidental causes, including increased intracranial pressure. A recent presentation at the American Academy of Forensic Sciences confirmed that retinal hemorrhages are linked to advanced cardiac life support with short term survival and/or cerebral edema of any etiology. E. Matshes, *Retinal and Optic Nerve Sheath Hemorrhages Are Not Pathognomonic of Abusive Head Injury*, AM. ACAD. FORENSIC SCIENCES Abstract G 1 (February 24, 2010).

Radiology Literature

31. Although shaken baby syndrome is closely associated with a radiologist, Dr. Caffey, radiology has had a very limited ability to confirm or refute this theory. For decades, the only imaging tools were x-rays and CT scans, which are relatively nonspecific. With the advent of magnetic resonance imaging (MRI), which has been used on a regular basis since the mid-to-late 1990s, radiologists have been to pinpoint the pattern of injury more precisely. Because MRI is more accurate, we now routinely order MRIs to supplement CT scans. The earlier this is done, the more likely it is that we will be able to provide accurate information on the pattern of injury and timing.

32. With MRI, we learned that many of the diagnoses we had been making using CT scans were incorrect, and that conditions viewed as diagnostic of child abuse are also found in accidental trauma and natural conditions. We also learned that CT scans do not reliably indicate the location of the hemorrhage, that is, whether it is in the brain, within a vessel (e.g. thrombosis), or in the subdural or subarachnoid space, and that the timing parameters for hemorrhages are much broader than previously believed. Before MRI, radiologists often timed hemorrhages shown on CT scan fairly precisely, e.g., within hours or days. However, with MRI, we found that these timing parameters were often incorrect. CT scans also missed older hemorrhages, some of which were weeks or months old and

may have been subject to re-bleed. There are apparently no MRI images of Brynn Ackley's injuries.

33. Radiology studies have also confirmed that 25-46% of asymptomatic newborns have subdural hemorrhages similar to those seen in allegedly abused children. C.B. Looney *et al.*, *Intracranial Hemorrhage in Asymptomatic Neonates: Prevalence on MR Images and Relationship to Obstetric and Neonatal Risk Factors*, 242 RADIOLOGY 535 (2007); V.J. Rooks *et al.*, *Prevalence and Evolution of Intracranial Hemorrhage in Asymptomatic Term Infants*, 29 AM. J. NEURORADIOLOGY 1082 (2008). Although birth subdurals typically resolve within weeks or months, some may become chronic and subject to expansion or re-bleeds. These findings undercut a basic premise of shaken baby syndrome, which assumed that subdural hemorrhages are immediately symptomatic and that the perpetrator can therefore be identified based on timing.

Non-medical Literature on Confessions

34. The confession literature is sometimes used to support shaking as a causal mechanism for the triad. However, this literature does not meet the standards of evidence-based medicine since it is retrospective, does not use comparison groups, and does not use evidence-based standards for classifying injuries as inflicted or non-inflicted. Thus, we do not know whether the child's symptoms preceded or followed the shaking, when the

shaking occurred (before the collapse or to resuscitate), the circumstances of the confession (e.g., what did they confess to, was it part of a plea bargain, was it videotaped, witnessed or recorded), how hard the shaking was, or even whether shaking occurred at all. A 2005 literature review concluded that the small number of recorded confessions does not permit valid statistical analysis or provide support for shaken baby syndrome. J. Leestma, *Case Analysis of Brain-Injured Admittedly Shaken Infants: 54 Cases 1969-2001*, 26 AM. J. FORENSIC MED. & PATHOLOGY 199 (2005).

Differential Diagnosis

35. Over the past decade, the differential diagnosis (alternative causes) for radiological findings previously associated with shaken baby syndrome/nonaccidental pediatric head injury, including subdural and retinal hemorrhage, has greatly expanded and now includes a variety of accidental and natural causes. The differential diagnosis for subdural and retinal hemorrhage and other findings previously attributed to inflicted head trauma or shaken baby syndrome now include: trauma (accidental or nonaccidental); medical or surgical interventions; prenatal, perinatal and pregnancy related conditions; birth trauma; metabolic, genetic, oncologic or infectious diseases; congenital malformations; autoimmune disorders; clotting disorders; the effects of drugs, poisons or toxins, including cocaine; and other miscellaneous conditions. K. Hymel, C. Jenny, & R.

Block, *Intracranial Hemorrhage and Rebleeding in Suspected Victims of Abusive Head Trauma: Addressing the Forensic Controversies*, 7 CHILD MALTREATMENT 329 (2002).

36. A 2006 text on abusive head trauma in infants and children contains a more comprehensive discussion of the medical disorders that mimic abusive head trauma, including superior sagittal sinus thrombosis; infection; medical or surgical complications; prenatal, perinatal and pregnancy related conditions; accidental trauma; genetic and metabolic disorders; hematological diseases and disorders; autoimmune, vasculitis and oncological conditions; and toxins, poisons and nutritional deficiencies. A Sirotnak, *Medical Disorders that Mimic Abusive Head Trauma*, in L. Frasier et al., ABUSIVE HEAD TRAUMA IN INFANTS AND CHILDREN: A MEDICAL, LEGAL, AND FORENSIC REFERENCE 191 (2006).

37. I have written on this topic as well. My 2007 article contains an expanded (6 page) description of the differential diagnosis and describes the parapsycho, which includes increased intracranial pressure, systemic hypotension or hypertension, increased venous pressure, vascular fragility, hematologic derangement and/or collagenopathy, superimposed on immature central nervous and other systems. P. Barnes, *Imaging of the Central Nervous System in Suspected or Alleged Nonaccidental Injury*,

(2007).

38. The newer literature recognizes that the ability to determine whether head injuries are accidental, non-accidental or natural in origin or to time the origins of particular findings is very limited. *See, e.g., G.A. Tung et al., Comparison of Accidental and Nonaccidental Traumatic Head Injury in Children on Noncontrast Computed Tomography*, 118 PEDIATRICS 626 (2006) (urging caution in making inferences on timing, pattern or cause of brain injuries based on single CT since comparison of subdural hemorrhages from birth injuries, short falls, motor vehicle accidents and presumed nonaccidental injuries did not find configurations specific for abuse).

39. The research on childhood stroke published in the last 10 years is a good example of the efforts that are being made to differentiate natural causes from traumatic brain injury and to develop appropriate prevention, intervention and treatment for infants and children. There is also increased recognition that the specific physiological attributes and vulnerabilities of children and infants, both as a group and individually, must be taken into account. These include the physiology of infant blood vessels and the susceptibility to physiological cascades due to immature central nervous system development.

40. There has also been increased research into second impact syndrome (SIS), which is well recognized in the sports literature. In these cases, a relatively small impact following an unresolved head injury occurring days to weeks previously can result in cerebral edema, a small subdural hemorrhage and death. R. Cantu & A. Gean, *Second-Impact Syndrome and a Small Subdural Hematoma: An Uncommon Catastrophic Result of Repetitive Head Injury with a Characteristic Imaging Appearance*, 27 J. NEUROTRAUMA 2557 (2010) (noting that SIS findings are similar to the findings in nonaccidental head injury cases; animal studies suggest increased vulnerability of the younger brain to repeated mild traumatic brain injury). Given these developments, prior accidental impacts, including cumulative mild impacts, must be considered in addressing the cause of death.

41. Like subdural hemorrhages, retinal hemorrhages have many causes and are not specific indicators of trauma. Although it has been suggested that severe retinal hemorrhages indicate abuse, such hemorrhages are also found in cases of infection and accidental death. *See. e.g., J.P. Lopez et al., Severe Retinal Hemorrhages in Infants with Aggressive, Fatal Streptococcus Pneumoniae meningitis*, 14 J. AM. ASSN. FOR PED. OPHTHALMOLOGY & STRABISMUS 97 (2010) (severe retinal hemorrhages

found in *s. pneumoniae*, the most common cause of community-acquired pneumonia).

42. In reviewing the radiology, a diagnosis of nonaccidental injury must rule out natural and accidental causes based on the medical records and clinical history, taking into account the combined or synergistic effects of two or more conditions. The range of possibilities is set forth in my recent review article, which addresses the advances and new learning in this field. P. Barnes, *Imaging of Nonaccidental Injury and the Mimics: Issues and Controversies in the Era of Evidence-Based Medicine*, 49 RADIOLOGIC CLINICS OF N. AM. 205 (2011). The role of the pediatric neuroradiologist is to identify possibilities and point out whether particular diagnoses are consistent or inconsistent with the radiology.

43. Given the developments in the literature, when a child presents with intracranial hemorrhage, retinal hemorrhage and/or cerebral edema, the differential diagnosis requires that the imaging be supplemented by a comprehensive medical history and extensive laboratory tests. Any evaluation should include consideration of the following possibilities:

- a. *Infection*. Any infection that spreads to the brain, including untreated or inadequately treated ear or sinus infections, can cause clotting, bleeding and ischemic injury (stroke or infarction). While most infections, including ear and

sinus infections, do not lead to brain damage, those that do can be devastating. Blood tests, cultures and autopsy slides can help identify infection, including sepsis (infection that has entered the bloodstream).

b. *Bleeding disorders (coagulopathy)*. Bleeding disorders, which can cause easy bruising as well as internal bleeding, may be asymptomatic until triggered by infection, trauma or hypoxia-ischemia. If the initial coagulation tests, such as the PTT, PT and fibrinogen, are abnormal, more specific tests can be conducted for specific coagulopathies, including von Willebrands and Vitamin K deficiencies.

c. *Hypoxia-ischemia*. Since the brain requires a constant flow of oxygen, hypoxic/ischemic damage from oxygen deprivation can occur within minutes. Hypoxia refers to a low level of oxygen in the blood while ischemia refers to an interruption of blood flow. Hypoxia/ischemia may occur from problems with the heart (e.g., beating too slow or too fast), lungs (pneumonia, including aspiration pneumonia) or airway (choking or gagging). Lack of oxygen causes the brain cells to break down, collect water, and eventually burst, causing edema. It also injures the cells that line the blood

vessels, causing leaky vessels and hemorrhage. This is a particular problem in infants, whose blood vessels have thin walls.

d. *Trauma.* In looking for impact, the radiologist looks for fractures, bruising on the brain or shear injury, while clinicians look for scalp bruising, a history of accidental falls, or signs of abuse. If impact is found, the history may help distinguish between intentional and accidental injury. If there are no specific signs of impact, nontraumatic causes should be high on the list of differential diagnoses.

e. *Re-bleeds.* Re-bleeds into pre-existing extracerebral collections from prior trauma (including birth trauma) can be spontaneous or triggered by infection, hypoxia-ischemia, minor trauma, venous thrombosis, or increased intracranial pressure from any cause, including choking, vomiting or respiratory problems. Minor re-bleeds can cause death by irritating the brain and causing epileptic-type seizures, or by irritating the brain stem, which controls breathing and heart rate.

f. *Cardiac issues.* Since the heart controls the flow of blood throughout the body, children with cardiac problems can

bleed and clot without trauma. Like seizures, cardiac arrhythmia cannot be detected at autopsy.

g. *Dehydration.* The relationship between dehydration and intracranial hemorrhage is well established in the pediatric literature.

h. *Medications.* Since many medications can increase the likelihood of hemorrhage and/or cardiac arrest, all medications (including those given at the hospital) should be carefully scrutinized.

i. *Metabolic and tissue diseases.* Metabolic and genetic diseases may cause intracranial bleeding. Some metabolic conditions can be diagnosed or excluded with simple, inexpensive tests. However, others require expensive testing, while yet others doubtlessly remain to be discovered.

j. *Benign extracerebral collections.* Some infants have a condition known as benign extracerebral collections of infancy. In these infants, cerebrospinal fluid collects between the brain and the skull, showing up on the CT scan as dark fluid areas in the subarachnoid space. The stretched veins that go through these areas may bleed spontaneously or with minor trauma.

k. *Clinical history.* At trial, it is often claimed that a previously healthy child has suddenly presented with subdural hemorrhage, retinal hemorrhage and brain swelling. However, a careful review of caretaker reports and medical records often indicates illness or longstanding medical issues. Some of the children were repeatedly seen by medical professionals for nonspecific symptoms, including feeding problems, reflux, seizure-like activity, ear infections, asthma or respiratory problems, often with no definitive diagnosis. These symptoms may suggest natural causes, including birth injuries, genetic or metabolic disorders, or aspiration pneumonia. The impact of any earlier accidents must also be considered.

l. *Resuscitation and post-admission treatment.* Some findings traditionally viewed as signs of abuse may be caused by resuscitation or hospital treatment. For example, vigorous CPR can cause bruises or even broken ribs, lying in one position can cause blood pooling, post-admission medications can cause post-admission hemorrhage, and resuscitation after a downtime may result in swollen brains and leaky blood vessels.

m. *Combination of factors.* It is always important to consider synergistic combinations of factors. For example, a

minor or inconsequential impact may have drastic consequences when combined with a coagulopathy, chronic subdural or other abnormality. Similarly, relatively minor infections may cause death if the child becomes septic or dehydrated. Since many factors may be involved, it is important to create a timeline based on the caretaker reports and medical records.

44. Similar considerations apply to fractures, bruises and other findings previously viewed as diagnostic of child abuse. For example, fractures may be caused by vitamin deficiencies or metabolic bone disease, and developmental abnormalities are sometimes mistaken for fractures. Fractures are also more difficult to time than previously believed. Bruises may similarly have natural causes, including coagulopathy, and cannot be dated as precisely as previously believed.

45. In reviewing Brynn Ackley's medical records, I saw no indication that her treating physicians, or the physicians that testified at Heidi Fero's trial, considered any potential causes of Brynn's injuries other than major nonaccidental injury.

Lucid Intervals

46. In addition to the literature described above regarding the mimics of abusive head trauma or shaken baby syndrome, recent

research has challenged the once-prevailing view that children always went unconscious immediately or very soon after suffering from head trauma.

47. Although there was some earlier evidence that children can remain lucid for a significant period of time after sustaining a fatal head injury, the first systematic evaluation of lucid intervals of which I am aware occurred in 2005. Abrogast and others examined the records for 314 fatally injured children. K.B. Abrogast *et al.*, *Initial Neurologic Presentation in Young Children Sustaining Inflicted and unintentional Fatal Head Injuries*, 116 PEDIATRICS 180 (2005). They concluded that 12.6% of children under 24 months old that had suffered inflicted injuries had Glasgow Coma Scale scores (characterized as moderate) of 8 or above on first examination. Also, 8.3% of children who suffered from falls had a similar GSC score. A GSC score of 8 or above (out of 15) can describe a variety of different states, all of which are conscious, not unconscious.

48. Given the new medical research on lucid intervals, the testimony of the State's experts to the effect that Brynn would have immediately gone unconscious is unsupported by the medical literature. It is impossible to tell from the radiology or otherwise in the medical record when Brynn was injured, and there is a significant

chance that she was injured before she arrived at Ms. Fero's home.

Review of Radiology

49. It is my understanding that Heidi Fero was convicted of causing the injuries evident in the radiology by shaking Brynn shortly before Brynn's arrival at Southwest Medical Center. The radiology does not support a diagnosis of shaken baby syndrome. Instead, the radiology is inconclusive. It is not possible to tell from the radiology whether Brynn's injuries were caused by accidental trauma, nonaccidental trauma, or any of the other mimics of shaken baby syndrome described in this declaration.

50. Preliminarily, I note that my review of the radiology was constrained by the poor quality and small size of the images available to me. Better quality and larger images might enable me to make additional findings.

51. The radiology images for Brynn Ackley, even though poor in quality, show features that are non-specific. That is, the findings may be attributed to several different causes, including natural causes. To determine precisely what caused the injuries, which might not be possible at all, would require a differential diagnosis (the identification of possible causations) supplemented by a complete review of the

child's medical records and clinical history.

January 7, 2002, CT Scan

52. A CT scan (contiguous 5 mm axial slices) was made at Southwest Washington Medical Center on January 7, 2002, at 10:43 p.m. shortly after Brynn arrived at that hospital. I reviewed the scan, as well as Dr. Bennett's notes on it. Dr. Bennett identified "global cerebral edema with effacement of basilar cisterns, acute interhemispheric and tentorial and left parietal subdural hemoatoma," as well as "7 mm of midline shift to the right." The report does not note whether there was a loss of grey-white differentiation. I have no basis to dispute Dr. Bennett's interpretation of the scans. However, I note that it is difficult to distinguish between subdural, subarchnoid, intradural or intraventricular hemorrhages on CT scans, especially in children, and I could not make that distinction with these scans. Hemorrhages like those identified by Dr. Bennett are nonspecific for cause, and would not explain Brynn's other injuries.

January 8, 2002, CT Scan

53. I reviewed the images from a CT scan conducted at approximately 7:45 am on January 8, 2002, as well as Dr. Bennett's report interpreting those images. In those images, an intracranial monitoring device is present, as is the left-sided craniectomy defect

(part of Brynn's skull was removed to give her brain space to swell). Some gray-white differentiation is present, and the basal cisterns are visualized. There is some interhemispheric hemorrhage, and little to no mid-line shift. The subdural hematoma that Dr. Bennett noted in his report of 1/7/02 is not present, because that was drained in surgery. Dr. Bennett's report outlines similar findings. There are no indicators of trauma, such as skull fractures, contusions, or shear injuries. That there is some gray-white differentiation suggests that the edema may be relatively recent. Edema may be secondary to other causes, including infection or lack of oxygen to the brain.

January 9, 2002, CT Scan

54. The images from a CT scan conducted at approximately 9:30 am on January 9, 2002, show the crainectomy defect and intracranial monitoring device. There is minimal mid-line shift, and poor gray-white differentiation. As Dr. Kozak's report notes, when compared with the CT scan taken on 1/8/02, there is more protrusion of the brain through the skull defect. The loss of gray-white differentiation suggests diffuse ischemic (restriction of blood and oxygen flow) event and infarct (tissue death). A follow-up cerebral blood flow exam conducted on 1/10/02 (the report, but not the test results themselves, was available to me) showed asymmetric flow,

with more blood flowing to the left cerebral parenchyma than the right (that is, toward the left-side cerebral edema). The report notes that the flow was not normal, but not consistent with brain death.

January 10, 2002, CT Scan

55. CT images from a scan conducted on January 10, 2002, at approximately 7 am show a more clearly delineated area of potential infarction. There is mild midline shift. These observations are consistent with those noted by Dr. Veverka in his report.

January 13, 2002, CT Scan

56. CT images from a scan taken on January 13, 2002, continue to show a loss of gray-white differentiation. There is more extensive mid-line shift, more profound infarct and more edema and protrusion of the brain through the craniectomy defect. These findings are consistent with those noted by Dr. Kozak in his report.

57. There were CT scans taken on 1/19/02, 1/30/02, 2/20/02, 2/27/02, 3/11/02, and 5/20/02. In general, these scans showed gradual atrophic changes, in both the left and right hemispheres, and a reduction in swelling over time.

Conclusion

58. I agree with Dr. Ophoven that this is a mistaken diagnosis of shaken baby syndrome. It is improbable that a child of this size

could have been shaken with the type of force suggested in shaken baby theory, and the absence of neck injury or grip marks further militates against this conclusion. Since Dr. Ophoven has been active in the shaken baby field, her conclusion that this is not a shaken baby case should be accorded considerable weight.

59. I agree with Dr. Ophoven that it is not medically possible to time the injuries to the time that Ms. Fero cared for the child. If the injury was inflicted, which is not apparent from the records, it is equally possible that it was inflicted earlier in the day. It may also have occurred even earlier.

60. I agree with Dr. Ophoven that it is not possible to time the bruises and abrasions. These may be normal toddler bruises, resulting from normal play or accidental falls over a period of days or weeks.

61. Recent literature does not provide scientific support that shaking alone can cause the injuries that Brynn Ackley exhibited. At the time of Ms. Fero's trial, many doctors would have agreed with the doctors for the state.

62. Today, as a pediatric neuroradiologist, I still work with children who are suspected victims of abuse. However, shaken baby syndrome theories as applied in this case are no longer supported by the scientific literature. Evidence-based medicine has not supported

the state's theory at Ms. Fero's trial, and this has become increasingly clear since her trial in 2003.

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DECLARED under penalty of perjury according to the laws of the State of

Washington, this 5th day of May, 2014, at

Palo Alto, California.

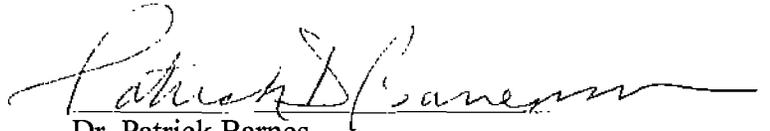

Dr. Patrick Barnes

EXHIBIT A

Name: Patrick D. Barnes, M.D. **2014**

Office Address: Department of Radiology
Lucile Salter Packard Children's Hospital
Stanford University Medical Center
725 Welch Road
Palo Alto, CA 94304

E-Mail: pbarnes@stanford.edu **Phone:** 650-497-8601

Place of Birth: Oklahoma City, Oklahoma, USA **Fax:** 650-497-8745

Education:

1965-1969 Letters / Pre-Medicine University of Oklahoma, Norman, OK
1969-1973 Doctor of Medicine University of Oklahoma College of Medicine, Oklahoma City, OK

Postdoctoral Training:

Residency:

1973-1976 Diagnostic Radiology, University of Oklahoma College of Medicine, Oklahoma City, Oklahoma

Fellowship:

1976-1977 Fellow in Pediatric Neuroradiology and Cardiovascular Radiology, Children's Hospital and Harvard Medical School, Boston, MA

Licensure and Certification:

1973 Federal Licensure Examination Certificate
1974 Oklahoma State Board of Medical Examiners
1977 American Board of Radiology Certificate in Diagnostic Radiology
1986 Commonwealth of Massachusetts Board of Registration in Medicine
2000 Medical Board of California C50437
1995 American Board of Radiology Certificate of Added Qualifications in Neuroradiology
2008 American Board of Radiology Maintenance of Certification in Neuroradiology

Academic Appointments:

1976-1977 Instructor in Radiology, University of Oklahoma College of Medicine
1977-1986 Lecturer in Radiologic Technology, University of Oklahoma College of Health
1977-1982 Assistant Professor of Radiology, University of Oklahoma College of Medicine
1980-1986 Adjunct Faculty, Radiologic Technology, Oscar Rose Junior College
1980-1986 Clinical Assistant Professor of Neurosurgery, University of Oklahoma College of Medicine
1982-1986 Associate Professor of Radiology, University of Oklahoma College of Medicine
1987-1992 Assistant Professor Radiology, Harvard Medical School
1992-2000 Associate Professor of Radiology, Harvard Medical School

Page 2

2000- Clinical Associate Professor of Radiology, Stanford University Medical Center
2002- Associate Professor of Radiology, Stanford University Medical Center
2007- Professor of Radiology, Stanford University Medical Center

Hospital and Affiliated Institution Appointments:

1977-1986 Pediatric Radiologist, Neuroradiology and Cardiovascular Radiology, Oklahoma Children's Memorial Hospital, Oklahoma City, Oklahoma
1977-1986 Consulting Radiologist, Oklahoma Memorial Hospital and Veterans Administration Hospital, Oklahoma City, Oklahoma
1984-1986 Consulting Radiologist, Oklahoma Diagnostic Imaging Center, Oklahoma City, Oklahoma
1987-1991 Associate Radiologist, Neuroradiology, The Children's Hospital, Boston, MA
1987-2000 Consulting Radiologist, Brigham and Women's Hospital, Beth Israel Hospital, New England Deaconess Hospital, Dana Farber Cancer Institute, Boston, MA
1990-1997 Clinical Coordinator, Magnetic Resonance Imaging, Children's Hospital, Boston, MA
1992-1995 Chief, Section of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA
1995-1999 Chief, Division of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA
1995-2000 Board of Directors, Children's Hospital Radiology Foundation, Inc.
1996-2000 Clinical Executive Committee, Department of Radiology, Children's Hospital, Boston, MA
1997-1998 Associate Director of CT, Department of Radiology, Children's Hospital, Boston, MA
1997-1999 Director of MRI, Department of Radiology, Children's Hospital, Boston, MA
1999-2000 Director, Division of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA
1999-2000 Treasurer, Children's Hospital Radiology Foundation, Inc.
1999-2000 Associate Chief for Clinical Operations, Department of Radiology, Children's Hospital, Boston, MA
2000 Senior Associate Neuroradiologist, Department of Radiology, Beth Israel Deaconess Medical Center, and Harvard Medical Faculty Physicians, Inc.
2000- Staff Physician, Pediatric Neuroradiologist, Lucile Salter Packard Children's Hospital and Stanford University Medical Center
2001- Interim Director, Pediatric Radiology, Lucile Salter Packard Children's Hospital (Jun-Aug./ JCAHO Survey)
2002- Chief, Section of Pediatric Neuroradiology, Lucile Salter Packard Children's Hospital, Stanford University Medical Center, Palo Alto, CA
2002- Co-Medical Director, MRI/CT Center, Lucile Salter Packard Children's

Hospital

Other Professional Positions and Major Visiting Appointments:

- 1988 Visiting Professor, The Western Pennsylvania Hospital, Pittsburg, PA
1989 Visiting Professor, New England Medical Center and Tufts University
Medical School, Boston, MA
1989 Visiting Professor, Akron Children's Hospital, Akron General Hospital,
and Northeastern Ohio Universities College of Medicine, Akron, Ohio
1990 Visiting Professor, Rhode Island Hospital and Brown University College
of Medicine, Providence, R.I.

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- 1991 Visiting Professor, University of Massachusetts Medical Center and
Medical School, Worcester, MA
1993 Visiting Professor, Columbus Children's Hospital and the Ohio State
University Hospitals, Columbus, OH
1993 Visiting Professor, Christchurch Hospital, University of Otago,
Christchurch, New Zealand
1993 Visiting Professor, Royal Children's Hospital, University of Melbourne,
Melbourne, Australia
1993 Visiting Professor, Royal Alexandra Hospital for Children, University of
Sydney, Sydney, Australia
1993 Visiting Professor, Prince of Wales Children's Hospital, University of
New South Wales, Sydney, Australia
1997 Visiting Professor, Montreal Children's Hospital, Montreal General
Hospital, Montreal Neurologic Institute, McGill University, Montreal,
Quebec, Canada
1998 Visiting Professor, Children's Hospital of Pittsburgh, University of
Pittsburgh, Pittsburgh, PA
1998 Visiting Professor, William Beaumont Hospital, Royal Oak, MI
2000 Visiting Professor, Rhode Island Hospital and the Hasbro Children's
HospitalBrown University School of Medicine, Providence, RI
2000 Visiting Professor, Massachusetts General Hospital, The Mass General
Hospital for Children, and Harvard Medical School, Boston, MA
2008 Visiting Professor, Department of Radiology, Duke University Medical
Center, Durham NC.
2009 Visiting Professor, Department of Radiology, Hospital for Sick Children,
University of Toronto, Toronto Ontario Canada.
2010 Visiting Professor, Department of Radiology, University of Arizona
Medical Center, Tucson AZ.
2010 Visiting Professor, Department of Radiology, Vancouver General
Hospital, BC Children's Hospital, University of British Columbia,
Vancouver BC, Canada.

Hospital and Health Care Organization Service Responsibilities:

- 1977-1986 Staff Pediatric Radiologist and Section Chief, Pediatric Neuroradiology
and Cardiovascular Radiology, Oklahoma Children's Memorial Hospital

1987-1992 Associate Radiologist, Neuroradiology, The Children's Hospital, Harvard Medical School, Boston, MA

1992-1995 Chief, Section of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA

1995-2000 Chief, Division of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA

1997-1998 Associate Director of CT, Department of Radiology, Children's Hospital, Boston, MA

1997-1999 Director of MRI, Department of Radiology, Children's Hospital, Boston, MA

1999-2000 Director, Division of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA

1999-2000 Associate Chief for Clinical Operations, Department of Radiology, Children's Hospital, Boston, MA

2000- Pediatric Neuroradiologist, Lucile Salter Packard Children's Hospital and Stanford University Medical Center

2001- Section Chief, Pediatric Neuroradiology, Lucile Salter Packard Children's Hospital, Stanford University Medical Center

2001- Interim Director, MRI/CT Center, Lucile Salter Packard Children's Hospital, Stanford University Medical Center

2002- Interim Director, Pediatric Radiology, Lucile Salter Packard Children's Hospital (Jun-Aug./ JCAHO Survey)

2002- Chief, Section of Pediatric Neuroradiology, Lucile Salter Packard Children's Hospital, Stanford University Medical Center, Palo Alto, CA

2002- Medical Co-Director, MRI/CT Center, Lucile Salter Packard Children's Hospital

Page 4

Major Administrative Responsibilities:

1984-1986 Clinical Project/Program Consultant, Oklahoma Diagnostic Imaging Center, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma

1985-1986 Clinical Project/Program Director, Oklahoma Teaching Hospitals, Magnetic Resonance Center

1987-1990 Clinical Coordinator, The Children's Hospital MRI Determination-Of-Need Process, Department of Public Health, The Commonwealth of Massachusetts, DON Certification, Jan. 1988.

1987-1990 Clinical Coordinator for MRI, The Children's Hospital and The Joint Center for Magnetic Resonance Imaging

1990-1997 Clinical Coordinator, Children's Hospital MRI Service.

1992-1995 Chief, Section of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA

- 1992-1999 Co-Director, Combined Neuroradiology Fellowship Program, Brigham & Women's Hospital, Beth Israel Hospital, Children's Hospital, New England Deaconess Hospital, Boston, MA
- 1992-1999 Director, Pediatric Neuroradiology Fellowship Program, Department of Radiology, Children's Hospital, Boston, MA
- 1995-2000 Chief, Division of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA
- 1996-2000 Board of Directors, Children's Hospital Radiology Foundation, Inc (CHRFI), Children's Hospital, Boston, MA
- 1996-2000 Clinical Executive Committee, Department of Radiology, Children's Hospital, Boston, MA
- 1997-1998 Associate Director of CT, Department of Radiology, Children's Hospital, Boston, MA
- 1997-1999 Director of MRI, Department of Radiology, Children's Hospital, Boston, MA
- 1998-1999 Chair, Bylaws Committee, Children's Hospital Radiology Foundation, Inc (CHRFI), Children's Hospital, Boston, MA
- 1999-2000 Treasurer, Children's Hospital Radiology Foundation, Inc.
- 1999-2000 Director, Division of Neuroradiology, Department of Radiology, Children's Hospital, Boston, MA
- 1999-2000 Associate Chief for Clinical Operations, Department of Radiology, Children's Hospital, Boston, MA
- 2000- Pediatric Neuroradiologist, Lucile Salter Packard Children's Hospital and Stanford University Medical Center
- 2001- Interim Director, Pediatric Radiology, Lucile Salter Packard Children's Hospital (Jun-Aug./ JCAHO Survey)
- 2002- Chief, Section of Pediatric Neuroradiology, Lucile Salter Packard Children's Hospital, Stanford University Medical Center, Palo Alto, CA
- 2002- Medical Co-Director, MRI/CT Center, Lucile Salter Packard Children's Hospital

Major Committee Assignments:

Hospital and Medical School:

- 1977-1981 Safety Committee, Oklahoma Children's Memorial Hospital
- 1977-1986 Neonatal Care Committee, Oklahoma Children's Memorial Hospital
- 1977-1986 Utilization Review Committee, Oklahoma Children's Memorial Hospital

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- 1979-1986 Education and Research Committee, Oklahoma Children's Memorial Hospital
- 1984-1985 Chairman, State of Oklahoma Teaching Hospitals Task Force on Magnetic Resonance, Oklahoma City, OK
- 1985-1986 Quality Assurance Committee, Oklahoma Children's Memorial Hospital
- 1988-1990 Chairman, Joint Center for Magnetic Resonance Imaging, Consortium Clinical and Research Committee, Boston, MA

- 1988-2000 Pediatric Brain Tumor Working Group, The Children's Hospital and Dana-Farber Cancer Institute, Boston
- 1988 Steering Committee, Magnetic Resonance Imaging, Department of Radiology, The Children's Hospital, Boston
- 1989-1991 Chair, Radiology Quality Assurance/Quality Improvement Audit Committee, Children's Hospital, Boston
- 106. Radiology Quality Improvement/Risk Management Committee, Children's Hospital, Boston
- 1992- Neuroradiology Consultant, Child Protection Service, Children's Hospital, Boston
- 1992-2000 Department of Radiology Sedation & Contrast Media Committee, Children's Hospital, Boston
- 1996 Review of the Department of Neurology, Ad Hoc Review Committee, Children's Hospital, Boston
- 1998-1999 Neuroscience Business Planning Steering Committee and Marketing Team, Children's Hospital, Boston
- 1998-1999 Harvard Medical School Information Technology Initiative, Hospital and Clinical Linkages Committee, Harvard Medical School and Children's Hospital, Boston
- 1991-1999 Representative, Department of Radiology, Physician's Leadership Council of the Physician's Organization, Children's Hospital, Boston
- 2000- Sedation Committee, Lucile Salter Packard Childrens Hospital at Stanford, Palo Alto, CA
- 2000- MR / CT Imaging Facility Planning Committee, Lucile Salter Packard Childrens Hospital at Stanford, Palo Alto, CA
- 2000- 6-Sigma GEMS MR Capacity Committee, Stanford University Medical Center, Palo Alto, CA.
- 2005- Phases I, II LPCH Expansion Committee, Imaging.

Regional:

- 1985-1986 Consultant on MRI, Oklahoma Health Planning Commission, Technical Advisory Committee, Oklahoma City, OK
- 2008- Member, Child Abuse Task Force, SCAN Team, Lucile Packard Children's Hospital, Stanford University Medical Center, and Santa Clara Valley Medical Center.

National:

- 1987-1999 Quality Assurance Review Center, National Brain Tumor Committee, and Diagnostic Imaging Committee, Pediatric Oncology Group - High-risk Medulloblastomas, Providence RI
- 1991-1993 Pediatric Medical Advisory Board for MRI, General Electric Medical Systems.
- 1991-2000 Member, Neurology Major Test Committee, American Board of Psychiatry and Neurology, National Board of Medical Examiners, Philadelphia, PA

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- 1998 Expert Panel Participant, Evidence-Based Guideline Development for the Management of Children Younger than Two Years of Age with Minor Head Trauma, Packard Foundation.
- 2000- Expert Panel Participant, Evidence-Based Neuroimaging in the Neonate-Practice Parameter Development Committee, American Academy of Neurology.
- 2005- Neuroradiologic Consultant / Central Reviewer, Neuroimaging and Neurodevelopmental Outcome, SUPPORT Multicenter Project, Neonatal Research Network, National Institute of Child Health and Human Development (NICHD).
- 2006- Neuroradiologic Consultant / Central Reviewer, Intervention Trial of Hypothermia for Term HIE Multicenter Project, Neonatal Research Network, National Institute of Child Health and Human Development (NICHD).
- 2007-2008 Chair, Child Abuse Task Force, Society for Pediatric Radiology.

Professional Societies and Offices:

- 1977-1986 Oklahoma County Medical Society
- 1977-1986 Oklahoma State Medical Association
- 1977-1986 Central Oklahoma Radiological Society
- 1977-1986 Oklahoma State Radiological Association
- 1977-1986 Central Oklahoma Pediatric Society
- 1977-1986 Oklahoma City Clinical Society
- 1977-1986 Oklahoma Neurological Society
- 1977- American Medical Association
- 1977- Radiologic Society of North America
- 1977- American College of Radiology
- 1980-1986 Rocky Mountain Neurosurgical Society
- 1980- Society for Pediatric Radiology
- 1980- American Society of Neuroradiology
- 1980- American Roentgen Ray Society
- 1987- New England Roentgen Ray Society
- 1987- Boston Neuroradiology Club
- 1987- Boston Pediatric Radiology Club
- 1987- Massachusetts Radiological Society
- 1988-1998 Society of Magnetic Resonance Imaging
- 1991-1992 Member, Pediatric Neuroradiology Subcommittee on Training and Practice Standards, American Society of Neuroradiology
- 1991- The Kirkpatrick Society
- 1992-1996 Chair, Pediatric Neuroradiology Committee, Society for Pediatric Radiology
- 1992-1998 Chair, Pediatric Neuroradiology Subcommittee on Training and Standards, American Society of Neuroradiology

- 1992-1993 Co-Founder and member-at-large, Steering Committee, Pediatric Neuroradiology Section of the American Society of Neuroradiology - the American Society of Pediatric Neuroradiology
- 1993-1995 Member-at-Large, Executive Committee, American Society of Pediatric Neuroradiology, and alternate Representative to Subspecialty Council, American Society of Neuroradiology
- 1995-1996 Treasurer, American Society of Pediatric Neuroradiology
- 1996-1997 Secretary and Chair, Membership Committee, American Society of Pediatric Neuroradiology
- 1996 Chair, Subcommittee "Standard for Cranial Computed Tomography in Infants and Children", The Society for Pediatric Radiology and American College of Radiology

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- 1997 Chair, Subcommittee "Standard for Cranial Magnetic Resonance Imaging in Infants and Children", The Society for Pediatric Radiology and American College of Radiology
- 1996 Member, Subcommittee "Standard for Sedation/Analgesia in Pediatric Radiology" (M. Cohen, Chair), The Society for Pediatric Radiology and American College of Radiology
- 1997-1998 Vice President, President-Elect, and Chair, Nominating/Award Committee, American Society of Pediatric Neuroradiology
- 1998 Member, Caffey Awards Committee, Society for Pediatric Radiology 41st Annual Meeting, Tucson, AZ, May 7-9
- 1998 Chair, Derek Harwood-Nash Award Committee, American Society of Pediatric Neuroradiology, American Society of Neuroradiology 36th Annual Meeting, Philadelphia, PA, May 17-21
- 1998-1999 President and Chair, Program/Education Committee, American Society of Pediatric Neuroradiology
- 1998-1999 Member, Executive Committee, Program Committee, Clinical Practice Committee, Clinical Outcomes Research Committee, American Society of Neuroradiology
- 1999-2000 Chair, Board of Directors, American Society of Pediatric Neuroradiology
- 2000- Chair, Standards and Guidelines Committee, American Society of Pediatric Neuroradiology
- 2000- Member, Child Abuse Committee, Society for Pediatric Radiology
- 2007 Chair, Child Abuse Task Force, Society for Pediatric Radiology
- 2008- Member, Child Abuse Task Force, Society for Pediatric Radiology
- 2008- Member, Neuroradiology Committee, Society for Pediatric Radiology

Editorial Boards:

- 1988- Reviewer, Radiology (journal of the Radiological Society of North America)
- 1988- Reviewer, American Journal of Neuroradiology (journal of the American Society of Neuroradiology)
- 1991- Editorial Board, Reviewer, Journal of Child Neurology

- 1991- Reviewer, American Journal of Roentgenology (American Roentgen Ray Society)
- 1993- Reviewer, Neuroradiology
- 1993- Reviewer, Pediatrics
- 1993- Reviewer, Journal of Pediatrics
- 1994- Editorial Board, Reviewer, Pediatric Radiology (Journal of The Society for Pediatric Radiology and the European Society for Pediatric Radiology)
- 1995-1997 Associate Editor for Pediatric Neuroradiology, International Medical Image Registry
- 1995- Reviewer, Journal of Computed Assisted Tomography
- 1997- Reviewer, Neurology

Awards and Honors:

- 1969 Letzeiser Honor List, University Of Oklahoma
- 1972 Alpha Omega Alpha
- 1973 Graduation with Honors, Doctor of Medicine, University of Oklahoma College of Medicine

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- 1995 Derek Harwood-Nash Outstanding Pediatric Neuroradiology Paper: Tzika AA, Barnes PD (mentor), Tarbell NJ, Nelson SJ, Scott RM. "Multivoxel proton spectroscopy of childhood brain tumors", presentation at ASNR 33rd Annual Meeting, Chicago, IL.
- 1996 Spirit Award, Children's Hospital, Boston, MA.
- 1996 Honorary Member, Australasian Society of Pediatric Imaging
- 1997 Kirkpatrick Young Investigator Award: Alberico RA, Barnes PD (mentor), Robertson RL, Burrows PE. "Dynamic cerebrovascular imaging in pediatric patients with use of helical CT angiography", paper presentation at the Society for Pediatric Radiology 40th Annual Meeting, St. Louis, MO.
- 1997 Cum Laude Citation (Scientific Exhibit): Levine D, Barnes PD (mentor), Madsen JR, Hulka CA, Li W, Edelman RR. "HASTE MR imaging improves sonographic diagnosis of fetal central nervous system anomalies", scientific exhibit and paper presentation at Radiological Society of North America 83rd Scientific Assembly and Annual Meeting, Chicago, IL.
- 1998 John A. Kirkpatrick Jr. Teaching Award, Pediatric Radiology Fellowship Program, Department of Radiology, Children's Hospital and Harvard Medical School, Boston, MA.
- 1999 Derek Harwood-Nash for Outstanding Pediatric Neuroradiology Paper: Robertson RL, Ben-Sira L, Schlaug G, Maier SE, Mulkern RV, Duplessis A, Barnes PD (mentor), Robson CD. Line scan diffusion imaging of the brain in neonatal cerebral infarction, paper presented at the ASNR/ASPNR Annual Meeting, San Diego, CA.

- 2000 Medical Intelligence Corporation Scientific Achievement Award for Outstanding Contributions to Neuroimaging in Enhancing Understanding of Timing of Fetal Injury, Las Vegas, Nevada, October 19, 2000.
- 2000 Outstanding Head & Neck Radiology Paper: Robson CD, Mulliken JB, Robertson RL, Proctor MR, Barnes PD (mentor). Prominent basal emissary foramina in syndromic craniosynostosis – correlation with phenotype and molecular diagnosis, paper presented at the ASNR/ASPNR/ASHNR Annual Meeting, Atlanta, GA, May 2000.
- 2001 Award of Appreciation for Service & Leadership as Past President 1998-1999, The American Society of Pediatric Neuroradiology, American Society of Neuroradiology 39th Annual Meeting, Boston, MA, April 23, 2001.
- 2003 Stanford B. Rossiter Senior Faculty of the Year 2002-2003. Outstanding Contributions to Resident Education, Compassionate Patient Care, and Research, Department of Radiology, Stanford University Medical Center.
- 2005 Senior Faculty of the Year 2004-2005. Outstanding Contributions to Resident Education, Compassionate Patient Care, and Research, Department of Radiology, Stanford University Medical Center.
- 2006 Senior Faculty of the Year 2005-2006. Outstanding Contributions to Resident Education, Compassionate Patient Care, and Research, Department of Radiology, Stanford University Medical Center.
- 2008 The Herman Grossman Lecturer, Department of Radiology, Duke University Medical Center, In Appreciation for Your Contributions to Pediatric Radiology and the Eleventh Annual Herman Grossman Lecturer, April 10, 2008.
- 2010 Caffey Award Scientific Paper. Bammer R, Holdsworth S, Skare S, Yeom K, Barnes P. Clinical evaluation of readout-segmented-EPI for diffusion-weighted imaging. Scientific Paper Presentation Society for Pediatric Radiology Annual Meeting, Boston MA April 2010.
- 2010 Caffey Award Scientific Paper. Skare S, Holdsworth S, Yeom K, Barnes P, Bammer R. High-resolution motion-corrected diffusion-tensor imaging (DTI) in infants. Scientific Paper Presentation Society for Pediatric Radiology Annual Meeting, Boston MA April 2010.
- 2010 Caffey Award Scientific Paper. Bammer R, Holdsworth S, Skare S, Yeom K, Barnes P. 3D SAP-EPI in motion-corrected fast susceptibility weighted imaging (SWI). Scientific Paper Presentation Society for Pediatric Radiology Annual Meeting, Boston MA April 2010.
- 2010 Caffey Award Scientific Paper. Bammer R, Holdsworth S, Skare S, Yeom K, Barnes P. T1-weighted 3D SAP-EPI for use in pediatric imaging. Scientific Paper Presentation Society for Pediatric Radiology Annual Meeting, Boston MA April 2010.
- 2012 An America's Top Doctor - US News & World Report (Top 1% of neuroradiologists in the nation for 5 years, Castle Connolly Medical Ltd.) <health.usnews.com/top-doctors>.

RESEARCH, TEACHING, AND CLINICAL CONTRIBUTIONS

Research Activities:

- 1985 Surface Coil Magnetic Resonance Imaging Clinical Research and Development Project, Dan Galloway, M.D., Patrick Barnes, M.D., and John Prince, Ph.D., Principal Co-Investigators, Oklahoma Diagnostic Imaging Center, University of Oklahoma Health Sciences Center and General Electric Medical Systems, Inc. (IRB#02926).
- 1986 Magnetic Resonance Imaging and the Evaluation of Morphologic and Biochemical Abnormalities. Patrick Barnes, M.D., and John Prince, Ph.D., Radiology, Principal Co-Investigators, University of Oklahoma Health Sciences Center (IRB#02958), Oklahoma Teaching Hospitals and Philips Medical Systems, Inc. (FDA-PMA-#P840063A).
- 1987-1991 Pre-Radiation Chemotherapy in the Treatment of Children with Brain Stem Neoplasia, Evaluation with CT and MRI, Pediatric Oncology Group, Cynthia Kretschmer, M.D., The Massachusetts General Hospital, Coordinator (POG8833); Neuroradiologic consultant.

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- 1988-1997 Infant Heart Surgery: CNS Sequelae of Circulatory Arrest, evaluation including Magnetic Resonance Imaging, Jane Newburger, M.D., Principal Investigator, Department of Cardiology, The Children's Hospital (NIH 1R01HL4178601); Neuroradiologic consultant.
- 1988-1998
- 1990-1991 Fast Spin Echo Magnetic Resonance Neuroimaging Project, Patrick Barnes, M.D. and Robert Mulkern, Ph.D., Principal Investigators, Children's Hospital, General Electric Medical Systems, Inc. (CH90-10-099).
- 1990-1997 Chemotherapy and Radiation Therapy in the Treatment of Seeding Tumors of the CNS in Children, Amy Billett, M.D. and Nancy Tarbell, M.D., Study Chairpersons (DFCI 90-114); Neuroradiologic consultant.
- 1990-1997 Radiosensitizer Chemotherapy (Etanidazole-SR 2508) and Radiotherapy in Children with Brain Stem Gliomas, Nancy Tarbell, M.D., Study Chairperson (DFCI 90-080); Neuroradiologic consultant.
- 1991-1999 High Stage Medulloblastomas, Quality Assurance Review Center, Pediatric Oncology Group, Nancy Tarbell, M.D. and Patrick D. Barnes, M.D., Co-Principal Investigators
- 1992-1997 Stereotactic Radiotherapy for Pediatric Brain Tumors, Nancy Tarbell, M.D., Study Chairperson (DFCI 92-077); Neuroradiologic consultant.
- 1992-1997 Stereotactic Radiation Therapy for Recurrent or Metastatic CNS Tumors, J. Fontanesi, M.D., J. Loeffler, M.D., P. Barnes, M.D., et al, Coordinators, Pediatric Oncology Group SRS #9373 Protocol.
- 1994-2000 MR-Techniques in the Assessment of the Newborn Brain, Steven A. Ringer, M.D., Ph.D., Petra S. Huppi, M.D., Co-Principal Investigators, JPN Clinical Research Initiative and Reynolds-Rich-Smith Fellowship; Neuroradiologic Consultant.
- 1996 Efficacy And Cost-Effectiveness of Fast-Screening Brain MRI Versus Conventional MRI in Children Suspected of Having a Brain Tumor L.

- Santiago Medina, M.D., Patrick D. Barnes, M.D., A.D. Paltiel, M.D., David Zurakowski, The Society for Pediatric Radiology Research and Education Fund Grant.
- 1996-2000 Metabolic and Hemodynamic MR Characterization of Pediatric Brain Tumors, A. Aria Tzika, Principal Investigator, Patrick Barnes, M.D., et al, Co-Investigator, American Cancer Society (EDT-80188)
- 1996-2000 Rehabilitation, Brain Lesions, and Movement in Infants, Edward E. Tronick, Ph.D., Linda Fetter, Ph.D., Alan Leviton, M.D., Co-Principal Investigators (NIH RO1); Neuroradiologic Consultant.
- 1996-2000 Ultrafast MRI of the Fetal Brain, D. Levine, M.D., Principal Investigator (NIH R29 NS37945-01), Beth Israel Deaconess Medical Center; Neuroradiologic Consultant.

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- 1999-2000 Pediatric Brain Tumor Consortium, M. Kieran, M.D., Nancy J. Tarbell, M.D. Co-Principal Investigators (NIH/NCI 1 U01 CA 81452-01), Children's Hospital, Massachusetts General Hospital, and Dana Farber Cancer Center; Member, Neuroradiology Committee and Senior Site Neuroradiologic Consultant.
- 1999-2000 Pediatric Centers for MRI Study of Normal Brain Development, NIH-NINDS-98-13, Michael Rivkin, M.D., principal investigator; Co-investigator and Consultant.
- 2001- PAR-98-017 (Reiss) NIMH Longitudinal MRI Study of Brain Development in Fragile X (7.5% effort funded).
- 2001- 2 R01 MH50047 (Reiss) NIMH Longitudinal Outcomes and Neuroimaging of Fragile X Syndrome (5% effort funded).
- 2001- Barth R, MRI of Fetal Ventriculomegaly.
- 2001 Arriagno R (NIH) Neonatal Diagnosis of Possible Brain Injury in Very Low Birth Weight Preterm Infants.
- 2001- Reiss et al. Velocardiofacial syndrome – neuroimaging.
- 2001- Reiss et al. Bipolar disorder – neuroimaging.
- 2001- Reiss et al. Coffin-Lowry syndrome – neuroimaging.
- 2002- Barnes P, et al. Stanford University Certification of Human Subjects Approval IRB Protocol ID 78050: Magnetic Resonance Imaging (MRI) of the Developing Central Nervous System (CNS), March 5, 2002.
- 2002- Diabetic Ketoacidosis Cerebral Edema Multicenter Study (N. Glaser et al [1% effort funded]).

- 2006- 2U HD 27880-16 Van Meurs (PI). Project period: 04/01/06–03/31/11
NIH/NICHHD *Multicenter Network of Neonatal Intensive Care Units Intervention Trial of Hypothermia for Term Hypoxic Ischemic Encephalopathy*. Role: Central MRI reader/Neuroimaging consultant
- 2006- 2U HD 27880-16 Van Meurs (PI). Project period: 04/01/06–03/31/11
NIH/NICHHD *Multicenter Network of Neonatal Intensive Care Units Neuroimaging and Neurodevelopmental Outcome, SUPPORT Multi-Center Project* This project investigates the value of brain magnetic imaging (MRI) in predicting neurodevelopmental outcome in extremely low birthweight (ELBW) infants. Role: Central MRI reader / Neuroimaging consultant
- 2008 The Well-Nourished and Sleeping Preterm Infant Will Have Improved Brain (Ariagno). Development and Neurodevelopmental Outcome. The Gerber Foundation. Consultant. 08/01/2005-07/31/2008
- 2008- NIH 1R01 EB008706 Bammer (PI) Project period: 09/01/08 – 08/31/13
Effort: 4.5% ADC: \$414,692 “Short Axis EPI MRI at High Field”
- 2008- Neuroradiologic Consultant / Central Reviewer, National Holoprosencephaly Project, The Carter Center.
- 2009- NIH 1R01 MH083972 Antonio Hardan (PI); Project period: 3/1/09 – 12-31-13; Effort: 4.5%; ADC: \$391,595 ; "A Neuroimaging Study of Twin Pairs with Autism"
- 2009- LPCH Center for Brain Behavior Awards in Pediatric Neurosciences K. Yeom (PI); Project Period: 2009-2011; Effort: 1%; ADC: \$145,000
“MR Imaging Correlates for Cognitive Dysfunction in Pediatric Medulloblastoma Treated with Cranial Irradiation.”

Teaching:

Local Contributions:

- 1976-1979 Course Director and Conference Leader, Pediatric House Staff Core Lecture Series, Pediatric Radiology, Oklahoma Children's Memorial Hospital
- 1976-1980 Conference Co-leader, Monthly Orthopaedic Radiology-Pathology Conference, Oklahoma Teaching Hospitals
- 1977-1979 Physician Associates Radiology Lecture Series, College of Allied Health, University of Oklahoma
- 1977-1982 Conference Co-Leader, Weekly Pediatric Cardiology and Cardiac Surgery Conference
- 1977-1982 Conference Co-Leader - "Sickle Cell Anemia", Annual Clinical Demonstration for First Year Medical Students, College of Medicine, University of Oklahoma.
- 1977-1982 Pediatric Cardiac Cine-Angiocardiographic case review and consultation weekly with Pediatric, Pediatric Cardiology, Thoracic Surgery Staff, Residents and Fellows
- 1977-1985 Pediatric Grand Rounds, Oklahoma Children's Memorial Hospital.
- 1977-1986 Attending Physician and Conference Leader, Daily and Weekly Clinical Teaching Rounds, Children's Memorial Hospital, University of Oklahoma College of Medicine; Pediatric Radiology Film and Fluoroscopy Review

- with Radiology, Pediatric, Family Medicine Residents and Medical Students.
- 1977-1986 Pediatric Neuroradiology Case Review and Consultation daily with Neurosurgery, Neurology, Pediatric, and Adolescent Medicine Staff, Residents, Fellows and Medical Students
- 1977-1986 Pediatric Computed Tomography, Conventional Tomography, and Special Procedures case review and consultation daily with Pediatric, Pediatric Surgery, Adolescent Medicine, and Orthopedic Staff, Residents, Fellows and Medical Students
- 1977-1986 Elective Tutorials in Pediatric Neuroradiology and Cardiovascular Radiology for Pediatric, Radiology, Neurosurgery, Neurology and Pediatric Surgery Residents, Fellows, and Students
- 1977-1986 Weekly Diagnostic Radiology Residency Lecture Series, University of Oklahoma College of Medicine

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- 1977-1986 Quarterly Radiologic Technology Inservice in Pediatric Neuroradiology and Cardiovascular Radiology Special Procedures
- 1977-1986 Co-Leader, Weekly Neurosurgery/Neurology Grand Rounds, Oklahoma Teaching Hospitals and St. Anthony Hospital, Oklahoma City, Oklahoma
- 1978-1982 Course Lecturer, Annual Department of Radiological Sciences Continuing Medical Education Courses, University of Oklahoma Health Sciences Center
- 1978-1985 Lecturer, Annual Graduate Physics Seminar, College of Allied Health, University of Oklahoma Health Sciences Center
- 1979-1981 Lecturer, Annual Radiology Grand Rounds, Oklahoma Teaching Hospitals
- 1980-1985 Lecturer, Pediatric Surgery Core Lecture Series in Pediatric Radiology, Oklahoma Children's Memorial Hospital
- 1981-1986 Lecturer, Neurology/Pediatric Neuroradiology Lecture Series, Oklahoma Teaching Hospitals
- 1982-1985 Participant, Senior Radiology Resident Pre-Board Examinations, University of Oklahoma College of Medicine
- 1982-1986 Lecturer, Pediatric House Staff Core Lecture Series in Pediatric Radiology, Oklahoma Children's Memorial Hospital
- 1983-1986 Course Developer and Director, Resident Final Examination in Pediatric Radiology, University of Oklahoma College of Medicine
- 1985-1986 Oklahoma Diagnostic Imaging Center Lecture Series, Course Co-Developer and Co-Director
- 1985-1986 Oklahoma Teaching Hospitals Department of Radiological Sciences, Magnetic Resonance Imaging Lecture Series (Course Developer and Director)
- 1986 "Magnetic Resonance Imaging for the Referring Physician", Continuing Medical Education Seminar, Program Co-Director, Session Moderator,

- and Lecturer, Oklahoma Teaching Hospitals and the University of Oklahoma College of Medicine
- 1987- Daily Neuroradiology Case Review and Consultation with Pediatric and Adolescent Medicine, Neurology, Neurosurgery, Radiology, Oncology, Radiation Therapy, Orthopedic, ORL/Head and Neck Surgery, Ophthalmology, Plastic Surgery, Oral Surgery, and Neuropathology Staff, Fellows, Residents, Medical Students, and visitors, Children's Hospital, Boston, MA
- 1987- Weekly Pediatric Neurology-Neuroradiology Rounds with Staff, Fellows, Residents, Medical Students, and visitors, Conference Co-Leader, Children's Hospital, Boston, MA
- 1987- Weekly Pediatric Neurosurgery-Neuroradiology Rounds with Staff, Fellows, Residents, Medical Students, and visitors, Conference Co-Leader, Children's Hospital, Boston, MA

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- 1987- Weekly Pediatric Neuroncology-Neuroradiology Rounds with Pediatric Oncology, Radiation Oncology, and Neurosurgery Staff, Fellows, Residents, Medical Students, and visitors (The Children's Hospital and Dana-Farber Cancer Institute), Conference Co-Leader, Children's Hospital, Boston, MA
- 1987- Weekly Longwood Medical Area Neuroradiology Conference with Staff, Fellows, Residents, Medical Students, and visitors (The Children's Hospital, Brigham & Women's Hospital, Beth Israel Hospital, New England Deaconess Hospital, Dana-Farber Cancer Institute), Conference Co-Leader, Children's Hospital, Boston, MA
- 1987- Monthly Pediatric ORL/Head & Neck Radiology Rounds with Staff, Fellows, Residents, Medical Students, and visitors, Conference Co-Leader, Children's Hospital, Boston, MA
- 1987- Monthly Pediatric Radiology Difficult Case Conference (Risk Management and Quality Improvement) with Staff, Fellows, Residents, Medical Students, and visitors, Children's Hospital, Boston, MA
- 1987- Monthly Boston Area Neuroradiology Club Case Conference with Staff, Fellows, Residents, Medical Students, and visitors (Massachusetts General Hospital)
- 1987- Pediatric Neuroradiology Annual Lecture Series, Course Co-Director and Lecturer, for Staff, Fellows, Residents, Medical Students, and visitors.
- 1987- Pediatric Neuroradiology Introductory Lectures for Harvard Medical Students and Rotating Radiology Residents, Radiology, Children's Hospital, Boston, MA
- 1987-1988 Cardiac Radiology Lecture Series, Course Developer and Lecturer, Radiology, Children's Hospital, Boston, MA
- 1987-1990 Magnetic Resonance Imaging Lecture Series, Course Developer, Director, and Lecturer, Radiology, Children's Hospital, Boston, MA

- 1987 Invited Lecturer, MRI in Pediatric Neuroradiology, Radiology Grand Rounds, Brigham and Women's Hospital, Boston, MA
- 1987 Lecturer, "Scoliosis and the Neuroradiologist", "The Impact of MR on Central Nervous System Imaging in Childhood", and "Magnetic Resonance-Diagnostic Imaging Principles", The Children's Hospital and Harvard Medical School Post- Graduate Course, Pediatric Imaging, Boston, MA
- 1987 Lecturer, "Pediatric Central Nervous System Imaging, The Brigham & Women's Hospital and Harvard Medical School Post-graduate Course, CT and MRI Update, Cambridge, MA
- 1988 Invited Lecturer, "MRI in Pediatric Neurooncology", Joint Center for Radiation Therapy Grand Rounds, Children's Hospital, Boston, MA, June 8, 1988
- 1988 Invited Lecturer, "Magnetic Resonance in Pediatric Imaging", The Children's Hospital and Harvard Medical School Post-graduate Course, Pediatric Medicine

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- 1988 Lecturer, "Magnetic Resonance Imaging of the Pediatric Central Nervous System, Part I - Brain" ; "Magnetic Resonance Imaging of the Pediatric Central Nervous System, Part II – Spine", & Case Review Panel, The Brigham & Women's Hospital and Harvard Medical School Post-graduate Course, CT and MRI Update, Cambridge, MA
- 1988 Invited Lecturer, "Magnetic Resonance Imaging", The Children's Hospital, Massachusetts General Hospital, and Harvard Medical School Post-graduate Course, Child Neurology
- 1989 Lecturer, "Magnetic Resonance in Pediatric Neuroimaging" ; "Magnetic Resonance Imaging in Spinal Dysraphism", The Brigham & Women's Hospital and Harvard Medical School Post-graduate Course, CT and MRI Update, Boston, MA
- 1989 Invited Lecturer, "Magnetic Resonance in Pediatric and Adolescent Neuroimaging", The Children's Hospital, Massachusetts General Hospital, and Harvard Medical School Post-graduate Course, Child Neurology
- 1990 Lecturer, "MR Imaging of the Pediatric Central Nervous System", The Brigham & Women's Hospital and Harvard Medical School Post-graduate Course, CT and MRI Update, Cambridge, MA
- 1991 Invited Lecturer, "MRI Signal Patterns-I", & "MRI Signal Patterns-II", Radiology Resident Lecture Series, University of Massachusetts Medical Center and Medical School, Worcester, MA, March 8, 1991
- 1991 Invited Lecturer, "Pediatric Spine Imaging", Radiology Grand Rounds, University of Massachusetts Medical Center and Medical School, Worcester, MA, March 8, 1991
- 1991 Invited Lecturer, "MRI of Congenital Spine Lesions", Neurology Grand Rounds, University of Massachusetts Medical Center and Medical School, Worcester, MA, March 9, 1991

- 1991 Invited Lecturer, "MRI of the Pediatric Central Nervous System", Western Massachusetts Radiological Society, Holyoke, MA, Sept. 24, 1991
- 1991 Lecturer, "MR Imaging of the Pediatric Central Nervous System", The Brigham & Women's Hospital and Harvard Medical School Post-graduate Course, CT and MRI Update, Cambridge, MA
- 1991 Invited Lecturer, "MRI in the Pediatric CNS", Harvard Longwood Neurological Training Program Post-graduate Course, Intensive Review of Neurology
- 1991 Invited Lecturer, "MRI in Pediatrics", Anesthesiology Grand Rounds, Children's Hospital, Boston, MA, Dec. 18, 1991
- 1992 Invited Lecturer, "Pediatric Brain Tumors", Radiology Grand Rounds, Boston City Hospital, University Hospital, and Boston University Medical School, Boston, MA, Feb. 25, 1992
- 1991 Invited Lecturer, "Cerebral Dysgenetic Syndromes, Clinical and MRI Correlates", Child Neurology Course, Massachusetts General Hospital, Children's Hospital, and Harvard Medical School Post-Graduate Course, September 1992, Boston, MA

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- 1992 Invited Lecturer, "Pediatric CNS Tumor Imaging", The Harvard Medical School Post-Graduate Course in Neurosurgery-Brain Tumors, November 30, Boston, MA
- 1993 Invited Lecturer, Massachusetts General Hospital and Harvard Medical School Radiology Review Course, "Congenital CNS Abnormalities". April, Cambridge, MA
- 1993 Lecturer, "Neuroimaging Techniques in Pediatrics", Child Psychiatry Lecture, Children's Hospital, Boston, MA, June 8, 1993
- 1993 Lecturer, "Neuroimaging in Pediatrics", Radiologic Technologist Inservice Lecture, Children's Hospital, Boston, MA, June 23, 1993
- 1993 Lecturer, "Neuroimaging-The Pediatric Brain", The Children's Hospital and Harvard Medical School Post-Graduate Course in Practical Pediatric Radiology, July 29, Brewster, MA.
- 1993 Invited Lecturer, "Malformations of the Brain", "Posterior Fossa and Craniocervical Junction Anomalies", The Massachusetts General Hospital and Harvard Medical School Post-Graduate Course in Neuroradiology, September 21 and 22, Boston, MA
- 1994 Lecturer, "Pediatric Neuroimaging: The Brain", The Children's Hospital and Harvard Medical School Post-Graduate Course in Practical Pediatric Imaging: Update '94, August 4, New Seabury, MA
- 1994 Presenter, "Brain Tumors in Children", The Massachusetts General Hospital and Harvard Medical School Post-Graduate Course in Neuroradiology, October 3-7, Boston, MA
- 1994 Lecturer, "Pediatric Brain Imaging", The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, Pediatric Brain Imaging, MRI and CT Update, October 27 and 28, Cambridge, MA

- 1995 Invited Lecturer, "Congenital CNS Abnormalities", Massachusetts General Hospital, Brigham and Women's Hospital, and Harvard Medical School Radiology Review Course, April, Cambridge, MA
- 1995 Lecturer, "Pediatric Brain Imaging- Protocols and Pitfalls", The Children's Hospital and Harvard Medical School Post-Graduate Course in Practical Pediatric Imaging: Update '95, July 26, New Seabury, MA
- 1995 Invited Lecturer, "Inflammatory CNS Conditions in Childhood", "Spine and Spinal Cord Anomalies in Childhood", The Massachusetts General Hospital and Harvard Medical School Post-Graduate Course, Basic and Current Concepts in Neuroradiology, Head & Neck Radiology, and Neuro MRI, September 19 and 20, Boston, MA
- 1995 Moderator, Pediatric Neuroradiology Session, The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI and CT Update, October 12 and 13, Cambridge, MA
- 1995 Lecturer, "Pediatric CNS Imaging: Protocols & Pitfalls", "Developmental Brain Abnormalities", The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI and CT Update, October 12 and 13, Cambridge, MA

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- 1996 Invited Lecturer, "Pediatric Neuroradiology", Massachusetts General Hospital, Brigham and Women's Hospital, and Harvard Medical School Radiology Review Course, April, Cambridge, MA
- 1996 Moderator, Pediatric Neuroradiology Session, The Children's Hospital and Harvard Medical School Post-Graduate Course in Practical Pediatric Imaging: Update 1996, July 22, Boston, MA
- 1996 Invited Lecturer, "Imaging of the Orbits and Sinuses: Part I", "Imaging of the Orbits and Sinuses: Part II", The Children's Hospital and Harvard Medical School Post-Graduate Course in Practical Pediatric Imaging: Update 1996, July 22, Boston, MA
- 1996 Invited Lecturer, "Congenital Brain Anomalies" and "Brain Tumors in Children", The Massachusetts General Hospital and Harvard Medical School Post-Graduate Course, Basic and Current Concepts in Neuroradiology, Head & Neck Radiology, and Neuro MRI, October 8, Boston, MA
- 1996 Moderator, Pediatric Neuroradiology Session, The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI & CT Update, October 25, Cambridge, MA
- 1996 Lecturer, "Hydrocephalus", The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI & CT Update, October 25, Cambridge, MA
- 1996 Invited Lecturer, "Imaging of Cranial and Intracranial Tumors of Childhood", The Brain Tumor Center, Brigham and Women's Hospital, Children's Hospital, Joint Center of Radiation Therapy, and Dana Farber Cancer Institute, Tumors of the Central Nervous System Post-Graduate Course, November 25, Boston, MA

- 1997 Invited Lecturer, "Potential Problems and Pitfalls in Pediatric Neuroradiology", Boston University Medical Center, Department of Radiology Grand Rounds, March 20, Boston, MA
- 1997 Lecturer, "Imaging of Macrocephaly, Parts I and II", The Children's Hospital and Harvard Medical School Post-Graduate Course in Practical Pediatric Imaging: Update 1997, July 21, Boston, MA
- 1997 Invited Lecturer, "Brain Tumors in the Pediatric Age", and "Congenital and Developmental Conditions of the Spine and Spinal Cord", The Massachusetts General Hospital and Harvard Medical School Post-Graduate Course, Basic and Current Concepts in Neuroradiology, Head & Neck Radiology, and Neuro MRI, September 15 and 16, Boston, MA
- 1997 Moderator, Pediatric Neuroradiology Session, The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI & CT Update 1997, October 31, Boston, MA
- 1997 Lecturer, "Congenital Brain Anomalies--A Problem-Oriented Approach", The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI & CT Update 1997, October 31, Boston, MA

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- 1997 Invited Lecturer, "Radiologic Diagnosis of Brain Tumors in Children", Joint Venture Neurooncology, The Partners Health Care System, Dana Farber Cancer Institute, and Harvard Medical School and Brain Tumor Management, November 24, Boston, MA
- 1997 Moderator, Pediatric Neuroradiology Session, Joint Venture Neurooncology The Partners Health Care System, Dana Farber Cancer Institute, and Harvard Medical School Post-Graduate Course, Tumors of the Central Nervous System and Brain Tumor Management, November 24, Boston, MA
- 1998 Invited Lecturer, The Brigham & Women's Hospital and Massachusetts General Hospital Radiology Review Post-Graduate Course, "Pediatric Neuroradiology", April 6, Cambridge, MA
- 1998 Invited Lecturer, "Congenital and Developmental Conditions of the Spine and Spinal Cord", The Massachusetts General Hospital and Harvard Medical School Post-Graduate Course, Basic and Current Concepts in Neuroradiology, Head & Neck Radiology, and Clinical Functional MRI and Spectroscopy, September 16, Boston, MA
- 1998 Moderator, Pediatric Neuroradiology Session, The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI/CT Update 1998, October 30, Boston, MA
- 1998 Lecturer, "Major Congenital Brain Anomalies", The Brigham and Women's Hospital and Harvard Medical School Post-Graduate Course, MRI/CT Update 1998, October 30, Boston, MA
- 1999 Invited Lecturer, "Neonatal MRI: New Techniques", Division of Newborn Medicine Clinical Conferences, Children's Hospital, January 4, Boston, MA

- 1999 Invited Speaker, Imaging of Brain Tumors in Children, Parents Workshop, Jimmy Fund Clinic, Dana-Faerber Cancer Institute, May 1, Boston, MA.
- 1999 Invited Speaker, Radiologic Diagnosis of Brain Tumors in Children, Tumors of the Central Nervous System: Management of Brain Tumors Post-graduate Course, Brigham and Women's Hospital, Massachusetts General Hospital, Children's Hospital, Dana-Faerber Cancer Institute, Harvard Medical School, September 13, Boston, MA
- 1999 Invited Speaker, Congenital and Developmental Conditions of the Spine and Spinal Cord, Neuroradiology, Head & Neck Radiology, Clinical Functional MRI and Spectroscopy Post-graduate Course, Massachusetts General Hospital, Massachusetts Eye & Ear Infirmary, Harvard Medical School, October 6, Boston, MA
- 1999 Invited Speaker, Potential Pitfalls in Pediatric Neuroradiology, and Session Moderator, Pediatric Neuroradiology Session, MRI/CT Update Post-graduate Course, Brigham & Women's Hospital, Harvard Medical School, October 29, Boston, MA

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- 2000 Invited Discussant, Pediatric Neuroncology, Neurosurgery, and Neurology Conferences, Department of Radiology, Massachusetts General Hospital, Jan.-Feb., Boston, MA
- 2000 Basic Technical and Biological Principles of Magnetic Resonance Imaging Lecture Series, Department of Radiology, Beth Israel Deaconess Medical Center, Feb.-May, Boston, MA
- 2000 Pediatric Neuroradiology Resident Pre-Board Review, Department of Radiology, Beth Israel Deaconess Medical Center, May, Boston, MA
- 2000- Daily Pediatric Neuroradiology and Head & Neck CT and MRI Case Review / Consultations with Fellows, Residents, Medical Students, and Visiting Physicians, Lucile Salter Packard Children's Hospital and Stanford University Medical Center, Palo Alto, CA
- 2000- Conference Co-Leader, Weekly Pediatric Neuroncology Conference, Lucile Salter Packard Children's Hospital at Stanford, Palo Alto, CA
- 2000- Conference Leader, Weekly Pediatric Neuroradiology, Neurology, and Neurosurgery Conference, Lucile Salter Packard Children's Hospital at Stanford, Palo Alto, CA
- 2000- Pediatric Neuroradiology Lectures, Neuroradiology Lecture Series, Department of Radiology, Stanford University Medical Center, Palo Alto, CA
- 2000- Faculty Participant, Weekly Neuroradiology Case Review / QI Conference Department of Radiology, Stanford University Medical Center, Palo Alto, CA
- 2000- Faculty Participant, Weekly Neurology Case Conference, Stanford University Medical Center, Palo Alto, CA
- 2000- Faculty Participant, Weekly Perinatal Conference, Lucile Salter

- Packard Children's Hospital at Stanford, Palo, Alto, CA
- 2000 Invited Lecturer, Pitfalls in Pediatric Neuroradiology, Neurosurgery Grand Rounds, Stanford University Medical Center, Palo Alto, CA Sept. 1, 2000
- 2000- Faculty Participant, International Perinatal Teleconferences (Hong Kong), Lucile Salter Packard Children's Hospital at Stanford, Palo Alto, CA
- 2000 Medical Student Clerkship Lecture, Pediatric Neuroradiology, Department of Radiology, Stanford University Medical Center, Palo, Alto, CA, Oct. 12, 2000
- 2000 Invited Lecturer, Imaging of Neonatal Encephalopathy, Neonatal Intensive Care Clinical Research Conference, Lucile Salter Packard Children's Hospital at Stanford, Palo Alto, CA, Oct. 16, 2000.
- 2001 Invited Lecturer, Potential Pitfalls in Pediatric Neuroradiology-The Impact of Advancing Neuroimaging Techniques, Department of Radiology, Stanford University Medical Center, Palo Alto, CA, Feb. 13, 2001.
- 2001 Faculty participant, Weekly Epilepsy Conference, Stanford University Medical Center, Palo Alto, CA.
- 2001- Monthly Pediatric Neuroradiology Lecture Series for Neurology Residents & Fellows, Stanford University Medical Center, Palo Alto, CA.
- 2001- Monthly Pediatric Neuroradiology Lecture Series for Neurosurgery Residents and Fellows Stanford University Medical Center, Palo Alto, CA.
- 2001- Monthly Pediatric Head & Neck Imaging Lecture Series for ORL/Head & Neck Residents and Fellows, Stanford University Medical Center, Palo Alto, CA.
- 2001- Pediatric Neuroradiology Lectures, Pediatric Radiology Lecture Series, Department of Radiology, Stanford University Medical Center, Palo Alto, CA.

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Regional, national, or international contributions:

- 1988 Invited Lecturer, "Neurocutaneous Syndromes", & "Pediatric Spine Imaging-Spinal dysraphism", Western Pennsylvania Hospital, Pittsburgh, PA, Nov. 3, 1988
- 1989 Invited Lecturer, "Pediatric Spine Imaging", New England Medical Center and Tufts Medical School, Feb. 9, 1989
- 1989 Invited Lecturer, "MRI-Basic Principles and Pediatric Applications", Akron Children's Hospital, Akron, OH, May 3, 1989
- 1989 Invited Lecturer, "MRI in Pediatric Spine Imaging", Northeast Ohio University Medical Center, Akron, OH, May 3, 1989
- 1989 Invited Lecturer, "MRI in Pediatric and Adolescent Neuroimaging", Akron Radiological Society, Akron, OH, May 3, 1989
- 1989 Invited Discussant, Neuroimaging-Neuropathology Correlation Conference, Akron Children's Hospital, Akron, OH, May 4, 1989

- 1989 Invited Lecturer, "Imaging of the Neurocutaneous Syndromes", Akron Children's Hospital, Akron, OH, May 4, 1989
- 1990 Invited Lecturer, "MRI in Pediatric Neuroimaging-Guidelines", & "Pediatric Spine Imaging", Rhode Island Hospital and Brown University Medical School, April 2, 1990
- 1990 Invited Lecturer, "Neuroimaging of the Neurocutaneous Syndromes", Radiology Grand Rounds, Rhode Island Hospital and Brown University Medical School, April 2, 1990
- 1991 Moderator, Pediatric Neuroradiology, Special Scientific Session, American Society of Neuroradiology, 29th Annual Meeting, Washington, D.C.
- 1991 Moderator and Discussant, Pediatric Neuroradiology Scientific Session, Radiological Society of North America 77th Annual Meeting, Chicago
- 1992 Invited Lecturer, "Signal Intensity Patterns in MRI of the Pediatric CNS", Radiology Resident Lecture, Ohio State University Health Sciences Center, Columbus, OH, April 8, 1992
- 1992 Invited Lecturer, "MRI in Pediatric CNS Imaging", Columbus Radiological Society, Columbus, OH, April 8, 1992
- 1991 Invited Lecturer, "Pediatric Spine Imaging", Radiology Grand Rounds, Columbus Children's Hospital, Columbus, OH, April 9, 1992
- 1992 Co-Moderator and Discussant, Scientific Session on Pediatric Neuroradiology, Society for Pediatric Radiology 35th Annual Meeting, May 17, Orlando, FL
- 1992 Invited Lecturer and Panelist, "Sedation in Pediatric Neuroradiology", American Society of Neuroradiology 30th Annual Meeting, June 3, St. Louis, MO
- 1992 Panelist, Scientific Session on Pediatric Neuroradiology, American Society of Neuroradiology 30th Annual Meeting, June 3, St. Louis, MO

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- 1993 Co-Moderator and Co-Discussant, Neuroradiology Long Papers Session, Society for Pediatric Radiology, 36th Annual Meeting, Seattle, Washington, May 13, 1993
- 1993 Co-Discussant, Pediatric Scientific Session, American Society of Neuroradiology, 31st Annual Meeting, Vancouver, B.C., Canada, May 19, 1993
- 1993 Discussant, Pediatric Specialties Scientific Session, American Society of Neuroradiology, 31st Annual Meeting, Vancouver, B.C., Canada, May 19, 1993
- 1993 Invited Lecturer, "MRI in Pediatric Imaging", Christchurch Hospital, University of Otago, Christchurch, New Zealand, Oct. 4, 1993
- 1993 Invited Lecturer, "Basics of MRI", & "Signal Intensity Patterns in MRI of the Pediatric CNS", and Discussant, Epilepsy Conference, Royal

- Children's Hospital, University of Melbourne, Melbourne, Australia, Oct. 11, 1993
- 1993 Invited Lecturer, "MRI in Pediatric Cerebrovascular Disease", and Discussant, Pediatric Neurology and Neurosurgery Conference, Prince of Wales Hospital, University of Sydney, Sydney, New South Wales, Australia, Oct. 13, 1993
- 1993 Invited Discussant, Radiology Resident Case Review Lecture, Royal Alexandra Hospital for Children, University of Sydney, Sydney, New South Wales, Australia, Oct. 13, 1993
- 1993 Invited Lecturer, "Imaging in Pediatric Neuroncology", "Neurocutaneous Syndromes", "Pediatric Neurovascular Diseases", Australasian Society for Paediatric Imaging (ASPI), October 15-17, Leura, New South Wales, Australia.
- 1993 Invited Lecturer, "Congenital & Developmental Brain Abnormalities", "Intracranial Inflammatory Processes", "Metabolic and Neurodegenerative Disorders", "Vascular Diseases and Trauma", "Cranial and Intracranial Tumors", "Neurocutaneous Syndromes", "Developmental and Acquired Abnormalities of the Spine and Spinal Neuraxis". ASPI MRI Symposium, October 18, Leura, New South Wales, Australia
- 1994 Invited Lecturer, "Imaging of the Pediatric Central Nervous System: Current Concepts", The Denby Bowdler Lecture, The Annual Post-Graduate Meeting, The Royal Alexandra Hospital for Children, Sydney, New South Wales, Australia, Oct. 21, 1993
- 1994 Moderator and Invited Lecturer, Update Course in Pediatric Radiology-Neuroradiology, Radiologic Society of North America, November 28, Chicago, IL.
- 1995 Invited Lecturer, Current Concepts in Pediatric Imaging-Neuroradiology, The Society for Pediatric Radiology, April 27, Colorado Springs, CO.
- 1995 Invited Lecturer, Society of Magnetic Resonance Technologists, Pediatric MRI-Sedation and Monitoring, 1994 Annual Regional Meeting, October 8, Boston, MA

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- 1995 Moderator and Invited Lecturer, Update Course in Pediatric Radiology-Neuroradiology, Radiological Society of North America, November 27, Chicago, IL
- 1995 Co-Moderator and Co-Discussant, Pediatric Scientific Session, American Society of Neuroradiology 33rd Annual Meeting, April 23, Chicago, IL
- 1995 Co-Moderator and Co-Discussant, Neuroradiology Scientific Session, Society for Pediatric Radiology, 38th Annual Meeting, April 29, Washington, D.C.
- 1995 Invited Lecturer, Emergency Pediatric Radiology Categorical Course-"Increased Intracranial Pressure"-American Roentgen Ray Society 95th Annual Meeting, April 30, Washington, D.C.

- 1995 Invited Lecturer, Update Course in Clinical Neuroradiology: Pediatric Neurovascular Imaging, Refresher Course, Radiological Society of North America, 81st Annual Meeting, November 29, Chicago, IL
- 1995 Invited Lecturer, Special Focus Session: Pediatric Sedation. Radiological Society of North America, 81st Annual Meeting, November 30, Chicago, IL
- 1996 Co-Moderator, and Co-Director, Pediatric Neuroradiology Session, IPR '96 Pediatric Neuroimaging Symposium, International Pediatric Radiology 3rd Conjoint Meeting, SPR, ESPNR, ASPI, May 25, Boston, MA
- 1996 Invited Lecturer, "Current and New Concepts in Imaging of the Pediatric Spine" IPR 96 Pediatric Neuroimaging Symposium., International Pediatric Radiology 3rd Conjoint Meeting, SPR, ESPNR, ASPI, May 25, Boston, MA
- 1997 Invited Lecturer, "Imaging of Head and Neck Masses in Childhood", McGill University, Department of Diagnostic Radiology Grand Rounds, January 20, Montreal, Quebec, Canada
- 1997 Invited Lecturer, "Cranial and Intracranial Tumors of Childhood: An Overview", Montreal Children's Hospital, Department of Diagnostic Imaging, January 21, Montreal, Quebec, Canada
- 1997 The Dr. Bernadette Nogrady Lecturer, "Imaging of the Neurocutaneous Syndromes in Childhood", Medical Grand Rounds, Montreal Children's Hospital, McGill University, Jan. 21, Montreal, Quebec, Canada.
- 1997 Invited Lecturer, "Congenital Malformations of the Brain", Practical MRI Categorical Course, American Roentgen Ray Society, 97th Annual Meeting, May 4, Boston, MA.
- 1997 Invited Lecturer, "MRI and Other Advanced Imaging Techniques", Spinal Dysraphism Workshop, Society for Pediatric Radiology, May 15, St.Louis, MO.
- 1997 Invited Lecturer, "Advanced Techniques in Pediatric Neuroradiology", New England Conference of Radiologic Technologists and New England Chapter of the American Radiology Nurses Association 39th Annual Fall Symposium, September 26, Sturbridge, MA

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- 1998 Invited Lecturer, "Imaging of the Pediatric Spine, Part I", Department of Radiology, Children's Hospital of Pittsburgh and University of Pittsburgh Medical Center, February 9, Pittsburgh, PA
- 1998 Invited Lecturer, "Potential Pitfalls in Imaging of the Pediatric CNS", Department of Radiology, Children's Hospital of Pittsburgh and University of Pittsburgh Medical Center, February 9, Pittsburgh, PA
- 1998 Invited Lecturer, Department of Radiology, Children's Hospital of Pittsburgh and University of Pittsburgh Medical Center, Teaching Session with Residents and Fellows, February 9, Pittsburgh, PA

- 1998 Invited Lecturer, "Imaging of the Pediatric Spine, Part II", Department of Radiology, Children's Hospital of Pittsburgh and University of Pittsburgh Medical Center, February 10, Pittsburgh, PA
- 1998 Invited Lecturer, "Imaging of CNS Injury in Child Abuse", Department of Radiology, Children's Hospital of Pittsburgh and University of Pittsburgh Medical Center, February 10, Pittsburgh, PA
- 1998 Invited Lecturer, Department of Radiology, Children's Hospital of Pittsburgh and University of Pittsburgh Medical Center, Teaching Session with Residents and Fellows, February 10, Pittsburgh, PA
- 1998 Invited Lecturer, "Potential Pitfalls in Imaging of the Pediatric CNS", Department of Radiology, William Beaumont Hospital, March 18, Royal Oak, MI
- 1998 Invited Lecturer, "Imaging of CNS Injury in Child Abuse", Department of Radiology, William Beaumont Hospital, March 18, Royal Oak, MI
- 1998 Course Director and Moderator, Multimodality Imaging of Head & Neck Lesions in Childhood -- The Oral Cavity, Jaw, and Neck; The Eye and Orbit; The Ear and Temporal bone; The Nose, Paranasal Sinuses, and Craniofacial Structures; Sunrise Sessions, The Society for Pediatric Radiology, 41st Annual Meeting, May 7-9, Tucson, AZ
- 1998 Co-Moderator, Scientific Session VI--Neuroradiology, The Society for Pediatric Radiology, 41st Annual Meeting, May 9, Tucson, AZ
- 1998 Invited Lecturer, Focus Session: Scoliosis "Imaging the Spine in Scoliosis", the American Society of Neuroradiology, 36th Annual Meeting, May 17-21, Philadelphia, PA
- 1998 Course Director and Moderator, Minicourse in Pediatric Neuroradiology: Session I: "Pediatric Neurovascular Diseases"; Session II: "Pediatric CNS Tumors"; Session III: "Congenital and Developmental Abnormalities"; Session IV: "Traumatic, Inflammatory, and Neurodegenerative Diseases", Radiological Society of North America, 84th Scientific Assembly and Annual Meeting, November 29-December 1, Chicago, IL
- 1998 Invited Speaker, Minicourse in Pediatric Neuroradiology, "Tumors about the Third Ventricle", Radiological Society of North America, 84th Scientific Assembly and Annual Meeting, November 30, Chicago, IL

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- 1998 Invited Speaker, Special Focus Session--Child Abuse Revisited, Radiological Society of North America, 84th Scientific Assembly and Annual Meeting, December 1, Chicago, IL
- 1998 Invited Lecturer, "Potential Pitfalls in Imaging of the Pediatric CNS", The Roger A. Hyman Memorial Lecture, Long Island Radiological Society and Winthrop-University Hospital, Dec. 8, Long Island, NY
- 1999 Invited Speaker, "Shaken Baby Syndrome", Current Issues in Emergency Practice, Seventh Annual Massachusetts Emergency Nurses Association

- and Massachusetts College of Emergency Physicians Course, April 13, Marlboro, MA
- 1999 Invited Speaker, "The Pediatric Radiologist as Expert Witness: How I do it", Society for Pediatric Radiology, Postgraduate Course, May 12, Vancouver, B.C., Canada
- 1999 Pediatric Focus Sessions Director and Moderator, Session I: "Diagnosis and Management of Head and Neck Vascular Anomalies of Childhood"; Session II: "Diagnosis and Management of Craniofacial Anomalies"; Session III: "Diagnosis and Management of Craniocervical Anomalies"; Session IV: Basic Science/Applications – Watershed Patterns: Anatomy and Pathology; Session V: Diagnosis and Management of Pediatric Neuroendocrine Disorders"; Session VI: "Diagnosis and Management of Pediatric Epilepsy", American Society of Neuroradiology/American Society of Pediatric Neuroradiology Annual Meeting, May 22-23, San Diego, CA
- 1999 Invited Speaker, Neurooncologic Imaging in Children, Neuroimaging Session, Frontiers of Hope, A Brain Tumor Symposium for Patients, Survivors, Family, Friends, and Professionals, The Brain Tumor Society, November 13, Providence, RI
- 2000 Invited Speaker, Potential Pitfalls in Pediatric Neuroradiology, Parts I & II, Department of Diagnostic Imaging Grand Rounds, Brown University School of Medicine, Rhode Island Hospital, and the Hasbro Children's Hospital, Providence RI.
- 2000 Invited Speaker, Neuroradiology of Pediatric Scoliosis, Practical Spine Imaging & Image Guided Therapy Symposium, The American Society of Spine Radiology, February 23, Marco Island, FL
- 2000 Invited Speaker, Diffusion Imaging in Children, ASNR 2000: Advanced Imaging Symposium, American Society of Neuroradiology, April 2, Atlanta, GA
- 2000 Moderator, Pediatric Scientific Session, American Society of Pediatric Neuroradiology, American Society of Neuroradiology Annual Meeting, April 2-8, Atlanta, GA

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- 2000 Invited Speaker, Pediatric Neuroradiology, Advanced Medical Malpractice Seminar, Office of Legal Education, Executive Office for U.S. Attorneys, United States Department of Justice, May 2, Columbia, SC.
- 2000 Invited Speaker, Course Director, Syllabus Editor / Co-author, & Session Moderator, Problem-Focused Strategies in Pediatric Neuroradiology: An Interactive Symposium, Society for Pediatric Radiology and American Society of Pediatric Neuroradiology Joint Post-graduate Course, May 4-6, Naples, FL.
- 2000 Invited Speaker and Participant, Fetal & Neonatal Neurologic Injury, Part

- I - Neuroimaging Patterns and the Timing of Fetal Brain Injury – Medical Intelligence Corporation Keynote Address; Part II - The Neuroimaging Expert, Birth Injury and the Law VII, Oct. 19, Las Vegas, NV
- 2001 Invited Speaker and Participant, Imaging of Fetal & Neonatal CNS Injury Parts I-III, 17th Annual Conference on Obstetrics, Gynecology, Perinatal Medicine, Neonatology, and the Law, Jan. 2-5, San Juan, PR
- 2001 Invited Speaker, Pediatric Spine Imaging, Fetal and Infant Neuro-MR, Pediatric Brain Imaging I-II, MR Update 2001, Neuroradiology and Musculoskeletal Imaging Advances, Stanford Radiology, Feb. 16, Las Vegas, Nevada
- 2001 Invited Speaker and Participant, Sam Hersch Cerebral Palsy Symposium at the Salk Institute, Feb. 27-28, La Jolla, CA.
- 2001 Invited Speaker & Session Co-coordinator, RSNA Oncodiagnosis Panel-Pediatric Brain Tumors, Radiologic Society of North America 87th Scientific Assembly and Annual Meeting, Chicago, IL, Dec. 28, 2001.
- 2002 Barnes PD. Invited Speaker. Current and Advanced Techniques in Imaging of the Pediatric Central Nervous System. Department of Neurology Grand Rounds. Stanford University Medical Center, Palo Alto, CA, Jan. 30, 2002.
- 2002 Invited Speaker. Current and Advanced Techniques in Pediatric Otolaryngology / Head & Neck Imaging – A Problem-focused Approach, Western Society of Pediatric Otolaryngology Annual Meeting, Lucile Packard Children’s Hospital at Stanford, Palo Alto, CA, Mar. 16, 2002
- 2002 Invited Speaker. Neuroimaging of congenital and neonatal Infections. Postgraduate Course: Perinatal and neonatal imaging, Society for Pediatric Radiology, Philadelphia, PA, May 2, 2002.
- 2002 Session Co-Moderator. White Matter Symposium. American Society of Neuroradiology / American Society of Pediatric Neuroradiology, Vancouver, B.C., May 16, 2002.
- 2003 Barnes PD. Current and Advanced Imaging of the Fetal and Neonatal CNS. Mid-Coastal California Perinatal Outreach Program, 23rd Annual Meeting, Stanford University School of Medicine, Monterey, CA, Jan. 2003.
- 2003 Barnes PD. Neuroimaging: a medical perspective. Litigating catastrophically injured infant cases, Association of Trial Lawyers of America, Feb.22, 2003, Atlanta, GA.
- 2003 Barnes PD. Trauma, including Child Abuse. CT & MRI: State of the Art & Unanswered Questions, SPR Postgraduate Course, San Francisco, CA, May 6, 2003.
- 2004 Barnes PD. Nonaccidental Head Injury in Children. Neurosciences Grand Rounds. Santa Clara Valley Medical Center. San Jose, CA, Feb. 5, 2004.
- 2004 Barnes PD. Forensic Science, Evidence-based Medicine, and the “Shaken Baby Syndrome”: Radiographic Imaging and Findings. American Academy of Forensic Sciences Annual Meeting, Dallas, Tx, Feb. 16, 2004.
- 2004 Barnes PD. Nonaccidental Injury of the Developing Brain: Issues,

- Controversies, and the Mimics. Moderator and Speaker. Neuroimaging Aspects. Focus Session, American Society of Pediatric Neuroradiology. American Society of Neuroradiology Annual Meeting, Seattle, WA, June 7, 2004.
- 2004 Barnes PD. Co-Moderator, Pediatric scientific session, American Society of Pediatric Neuroradiology, American Society of Neuroradiology Annual Meeting, Seattle, WA, June 8, 2004.
- 2004 Barnes PD. Moderator, Pediatric Session and Speaker. MDCT applications in Pediatric Neuroradiology (Brain, Spine, Head & Neck). 6th Annual International Symposium on Multidetector-Row CT. Stanford University Medical Center, San Francisco CA, June 23, 2004.
- 2004 Barnes PD. Child abuse: the role of neuroimaging in the clinical and forensic evaluation of suspected nonaccidental injury including its mimics. 12th Annual Pediatric Update, Lucille Packard Children's Hospital and Stanford University Medical Center, July 16, 2004.
- 2005 Barnes PD. Neuroimaging of the pediatric spine – scoliosis. Neuroscience Grand Rounds. Santa Clara Valley Medical Center. San Jose, CA, March 3, 2005.
- 2005 Barnes PD. Diagnostic imaging of neonatal brain injury. California Association of Neonatologists (CAN) and American Academy of Pediatrics (AAP) District IX Section on Perinatal Pediatrics, 11th Annual Conference, Current Topics and Controversies in Perinatal and Neonatal Medicine, Coronado CA, March 6, 2005.
- 2005 Barnes PD. Co-moderator, Neuroradiology scientific session, Society for Pediatric Radiology Annual Meeting, New Orleans, LA, May 7, 2005.
- 2005 Barnes PD. Moderator, CAQ Review Sessions, Pediatric Brain, Head & Neck, and Spine Imaging, American Society of Pediatric Neuroradiology, American Society of Neuroradiology Annual Meeting, Toronto, Ontario, Canada, May 26-27, 2005.
- 2005 Barnes PD. Co-Moderator, Pediatric scientific session, American Society of Pediatric Neuroradiology, American Society of Neuroradiology Annual Meeting, Toronto, Ontario, Canada, May 26, 2005.
- 2005 Barnes P. Child abuse: the role of neuroimaging in the clinical and forensic evaluation of suspected nonaccidental injury including its mimics. 13th Annual Pediatric Update, Lucille Packard Children's Hospital and Stanford University Medical Center, July 8, 2005.
- 2005 Barnes P. Child abuse: the role of neuroimaging in the clinical and forensic evaluation of suspected nonaccidental injury including its mimics. Neurosurgery Grand Rounds, Stanford University Medical Center, July 15, 2005.
- 2006 Barnes P. Imaging of the Pediatric Central Nervous System and Head & Neck: MRI, CT, US, Nuclear Medicine – Which to do? 14th Annual Pediatric Update, Lucille Packard Children's Hospital and Stanford University Medical Center, July 21, 2006.
- 2006 Barnes P. Child Abuse: Issues and Controversies in the Era of Evidence-Based Medicine. Pediatric Grand Rounds, Lucille Packard Children's

- 2006 Hospital and Stanford University Medical Center, October 13, 2006.
 2006 Hahn J, Barnes P. Prenatal Neurologic Consultations and Management of Brain Malformations. Pediatric Grand Rounds, Lucile Packard Children's Hospital and Stanford University Medical Center, Nov. 3, 2006.
2007. Barnes PD. Co-Director and Co-Moderator. Brain, Head & Neck, and Spine Imaging. Advances in Pediatric CT and MRI. Department of Radiology, Stanford School of Medicine Postgraduate Course. Las Vegas, Nevada, March 17, 2007.
- 2007 Barnes PD. Lecturer. Advances in Pediatric CT and MRI: Head & Neck Imaging I (Orbit, Sinus, Ear), Head & Neck Imaging II (Face & Neck), Spine Imaging I (Developmental Anomalies), Spine Imaging II (Acquired Conditions), Brain Imaging III (Acute neurologic conditions – Trauma [including child abuse], hemorrhage, vascular disease), Brain Imaging V (Subacute neurologic conditions – Tumors, epilepsy). Department of Radiology, Stanford School of Medicine Postgraduate Course. Las Vegas, Nevada, March 17, 2007. Course Syllabus.
- 2007 Barnes PD. Lecturer. How I do it – Advanced Neuro-MRI of Nonaccidental CNS injury and its Mimics. Society for Pediatric Radiology 50th Annual Meeting and Postgraduate Course. Miami FL. April 20, 2007.
- 2007 Barnes P. Lecturer. Child Abuse: Pitfalls in Pediatric Neuroimaging. EBMS Symposium: An Evidence-based Analysis of Infant Brain and Skeletal Injury. Chicago IL, May 10, 2007.
- 2007 Barnes P. Lecturer. Child Abuse: Issues and Controversies in the Era of Evidence-Based Medicine. Department of Social Services and Child Protection, Lucile Packard Children's Hospital and Stanford University Medical Center, June 21, 2007.
- 2007 Barnes P. Lecturer. Child Abuse: Issues & Controversies. Pediatrics CME Program. Salinas Valley Memorial Healthcare System, Salinas CA, Nov. 16, 2007.
- 2008 Barnes P. Lecturer. Child Abuse and the Mimics. Imaging of Brain, Blood, & Bones. Death of a Child Symposium. The Center for American and International Law. Plano TX, March 4, 2008.
- 2008 Barnes P. Imaging of Child Abuse: Controversies in the Era of Evidence-Based Medicine. Herman Grossman Visiting Lecturer. Radiology & Pediatrics Grand Rounds. Duke University Medical Center, Durham NC, April 10, 2008.
- 2008 Barnes P. Update on Brain Imaging in Nonaccidental Trauma. Neuroimaging I Session, Pediatric Radiology Series. Radiologic Society of North America, Chicago IL, Nov. 30, 2008.
- 2008 Barnes P. Co-Moderator & Discussant, Neuroimaging I Scientific Paper Session, Pediatric Radiology Series, Radiologic Society of North America, Chicago, IL Nov. 30, 2008
- 2008 Barnes P. Neuroimaging in the Evaluation of Pattern and Timing of Fetal and Neonatal Brain Injury. Fetal & Neonatal Annual Care Conference. Santa Clara Valley Medical Center. San Jose CA, November 7, 2008.
- 2009 Barnes P. Medical Imaging in Brain Trauma; Intracranial Hemorrhage

- and Thrombosis (Krasnokutsky M): Imaging & Pitfalls. An Evidence-based Analysis of Infant Brain & Skeletal Trauma. EBMS Symposium, Denver CO, February 22, 2009.
- 2009 Barnes P. Imaging of Child Abuse and the Mimics: Controversies in the Era of Evidence-Based Medicine. Innocence Network Conference. South Texas College of Law, Houston TX, March 21, 2009.
- 2009 Barnes P. Neuroimaging in the Evaluation of Pattern and Timing of Fetal and Neonatal Brain Abnormalities. The Latest Tools and Science to Determine the Origin and Timing of Irreversible Brain Damage. Obstetric Malpractice West Coast Conference & Workshop. San Francisco CA, April 28, 2009.
- 2009 Child Abuse and the Mimics: Controversies in the Era of Evidence-Based Medicine. Visiting Professor, Department of Radiology, Hospital for Sick Children, University of Toronto, Toronto Ontario Canada, Sept. 24, 2009.
- 2009 Child Abuse, NAI, and the Mimics: Controversies in the Era of Evidence-Based Medicine Seminar. Shaken Baby Death Review Team (Gouge Inquiry). Ministry of the Attorney General, Province of Ontario. Toronto Ontario, Canada, Sept. 24, 2009.
- 2009 Child Abuse – Nonaccidental Injury (NAI): Controversies in the Era of Evidence-Based Medicine. Controversies in Forensic Science and Medicine: Towards Resolution in the 21st Century. Centre for Forensic Science and Medicine, University of Toronto, Toronto Ontario, Canada, Sept. 25, 2009.
- 2010 Neuroimaging in the Evaluation of pattern and timing of fetal and neonatal brain abnormalities. The 26th Annual Conference on Obstetrics, Gynecology, Perinatal Medicine, Neonatology, and the Law. Boston University Continuing Medical Education Course, San Jose del Cabo, Mexico, Jan. 2, 2010 (Program and Website material only).
- 2010 Evidence-based Update: Imaging in Nonaccidental Injury and the Mimics: Blood, Brain, & Bones. National Association of Criminal Defense Attorneys and the Innocence Network (Bureau of Justice Assistance Grant), April 15, 2010, Atlanta GA.
- 2010 Imaging of the Pediatric Head & Neck (Resident & Fellow Lecture), Department of Radiology, University of Arizona Medical Center, Tucson AZ, June 9, 2010.
- 2010 Child abuse and the mimics. Update on issues & controversies in the era of evidence-based medicine. Pediatric Grand Rounds. Department of Pediatrics. University of Arizona Medical Center, Tucson AZ, June 9, 2010.
- 2010 Imaging of fetal and neonatal brain abnormalities. Birth Injury Group. American Association of Justice, Vancouver, BC, Canada, July 11, 2010.
- 2010 Invited Lecturer & Panelist. Child abuse and the mimics. Update on issues & controversies in the era of evidence-based medicine. National Child Abuse DRC Conference, Las Vegas NV, August 26, 2010.
- 2010 Expert Testimony (Baumer Case). Child abuse and the mimics. Update on issues & controversies in the era of evidence-based medicine. Michigan

- Innocence Project. University of Michigan Law School, Detroit, Michigan September 30, 2010.
- 2010 Child abuse and the mimics. Update on issues & controversies in the era of evidence-based medicine. Neuroscience Grand Rounds, Vancouver General Hospital, BC Children's Hospital, University of British Columbia, Vancouver BC, Canada, October 13, 2010.
- 2010 Pediatric Head & Neck Imaging I, II; Pediatric Spine Imaging (Resident & Fellow Lecture Series), Department of Radiology, Vancouver General Hospital, BC Children's Hospital, University of British Columbia, Vancouver BC, Canada, October 13-14, 2010.
- 2010 Imaging of Pediatric CNS Malformations (Neuroradiology and Pediatric Radiology Fellow Lecture), Department of Radiology, Vancouver General Hospital, BC Children's Hospital, University of British Columbia, Vancouver BC, Canada, October 14, 2010.
- 2011 Neuroimaging in the Evaluation of pattern and timing of fetal and neonatal brain abnormalities (3 lectures). The 27th Annual Conference on Obstetrics, Gynecology, Perinatal Medicine, Neonatology, and the Law. Boston University Continuing Medical Education Course, Maui, Hawaii, January 2-6, 2011.
- 2011 Imaging of the Pediatric Head & Neck; Imaging of Pediatric CNS Malformations; Imaging of Pediatric CNS Tumors. Radiology Board Review Course. Las Vegas NV, January 12, 2011.
- 2011 Imaging of child abuse and the mimics. Issues & controversies in the era of evidence-based medicine. California Public Defenders Association Annual Meeting, Monterey, CA, January 21, 2011.
- 2011 Invited Participant & Discussant, Pediatric Abusive Head Trauma. Medical, Forensic, and Scientific Advances and Prevention. Third International Conference. Penn State Hershey College of Medicine. San Francisco, CA, July 7-8, 2011.
- 2011 Imaging of child abuse and the mimics. 2nd Biennial International Conference on Brain Injury in Children, SickKids Centre for Brain & Behavior, The Hospital for Sick Children, July 13, 2011, Toronto, Canada.
- 2011 Imaging of child abuse and the mimics. Evidence Based Medicine and Social Investigation (EBMSI) Conference, Vancouver, Canada, August 5, 2011.
- 2011 Child abuse and the mimics: controversies in the era of evidence-based medicine. Cook County Public Defenders' Conference, Oak Brook IL September 8-9, 2011.
- 2011 Findley K, Barnes P, Moran D, Sperling C. Challenging shaken baby syndrome convictions in the light of new medical and scientific research. *Integris Health* Law & Medicine Lecture Series. Innocence Project. Oklahoma City University School of Law, Oklahoma City, OK, Sep. 21, 2011.
- 2011 Invited Speaker. Imaging of the pediatric brain, spine, and head & neck. National Association of Pediatric Nurse Advanced Practitioners (NAPNAP), San Francisco Bay Area Chapter. 2nd Annual Meeting,

- Stanford University, Stanford CA, October 29, 2011.
- 2011 Invited Speaker. Fetal and neonatal brain imaging. "Perinatal Care: All About The Family" Annual Conference. VMC Foundation, Santa Clara Valley Medical Center, San Jose CA, November 3, 2011.
- 2012 Imaging of child abuse and the mimics. Evidence Based Medicine and Social Investigation (EBMSI) Conference, Vancouver, Canada, August 3, 2012.
- 2012 Invited Lecturer & Panelist. Child abuse and the mimics. Update on issues & controversies in the era of evidence-based medicine. National Child Abuse DRC Conference, Las Vegas NV, September 6, 2012.
- 2012 Invited Speaker. Fetal and neonatal brain imaging. "Perinatal Care: All About The Family" Annual Conference. VMC Foundation, Santa Clara Valley Medical Center, San Jose CA, October 31, 2012.
- 2013 Imaging of child abuse and the mimics. Evidence Based Medicine and Social Investigation (EBMSI) Conference, Vancouver, Canada, August 2, 2013.
- 2013 Invited Lecturer. Child Abuse – Nonaccidental Injury (NAI) - Abusive Head Trauma (AHT) - Issues and Controversies in the Era of Evidence-Based Medicine, An Update. World Congress on Infant Head Trauma. American Forensic Pathology Incorporated. The Center for American and International Law. Plano, Texas, USA, November 15, 2013.

Teaching Awards:

- 1998 John A. Kirkpatrick Jr. Teaching Award, Pediatric Radiology Fellowship Program, Department of Radiology, Children's Hospital and Harvard Medical School, Boston, MA.
- 2003 Stanford B. Rossiter Senior Faculty of the Year 2002-2003. Outstanding Contributions to Resident Education, Compassionate Patient Care, and Research, Department of Radiology, Stanford University Medical Center.
- 2005 Senior Faculty of the Year 2004-2005 Outstanding Contributions to Resident Education, Compassionate Patient Care, and Research, Department of Radiology, Stanford University Medical Center.
- 2006 Senior Faculty of the Year 2005-2006. Outstanding Contributions to Resident Education, Compassionate Patient Care, and Research, Department of Radiology, Stanford University Medical Center.

Major Curriculum and Educational Programs Developed:

- 1976-1979 Course Director and Conference Leader, Pediatric House Staff Core Lecture Series, Pediatric Radiology, Oklahoma Children's Memorial Hospital
- 1976-1980 Conference Co-leader, Monthly Orthopaedic Radiology-Pathology Conference, Oklahoma Teaching Hospitals
- 1977-1979 Physician Associates Radiology Lecture Series, College of Allied Health, University of Oklahoma
- 1977-1982 Conference Co-Leader, Weekly Pediatric Cardiology and Cardiac Surgery Conference

- 1977-1982 Conference Co-Leader - "Sickle Cell Anemia", Annual Clinical Demonstration for First Year Medical Students, College of Medicine, University of Oklahoma.
- 1977-1982 Pediatric Cardiac Cine-Angiographic case review and consultation weekly with Pediatric, Pediatric Cardiology, Thoracic Surgery Staff, Residents and Fellows
- 1977-1985 Pediatric Grand Rounds, Oklahoma Children's Memorial Hospital.
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- 1977-1986 Attending Physician and Conference Leader, Daily and Weekly Clinical Teaching Rounds, Children's Memorial Hospital, University of Oklahoma College of Medicine; Pediatric Radiology Film and Fluoroscopy Review with Radiology, Pediatric, Family Medicine Residents and Medical Students.
- 1977-1986 Pediatric Neuroradiology Case Review and Consultation daily with Neurosurgery, Neurology, Pediatric, and Adolescent Medicine Staff, Residents, Fellows and Medical Students
- 1977-1986 Pediatric Computed Tomography, Conventional Tomography, and Special Procedures case review and consultation daily with Pediatric, Pediatric Surgery, Adolescent Medicine, and Orthopedic Staff, Residents, Fellows and Medical Students
- 1977-1986 Elective Tutorials in Pediatric Neuroradiology and Cardiovascular Radiology for Pediatric, Radiology, Neurosurgery, Neurology and Pediatric Surgery Residents, Fellows, and Students
- 1977-1986 Weekly Diagnostic Radiology Residency Lecture Series, University of Oklahoma College of Medicine
- 1977-1986 Quarterly Radiologic Technology Inservice in Pediatric Neuroradiology and Cardiovascular Radiology Special Procedures
- 1977-1986 Co-Leader, Weekly Neurosurgery/Neurology Grand Rounds, Oklahoma Teaching Hospitals and St. Anthony Hospital, Oklahoma City, Oklahoma
- 1978-1982 Course Lecturer, Annual Department of Radiological Sciences Continuing Medical Education Courses, University of Oklahoma Health Sciences Center
- 1978-1985 Lecturer, Annual Graduate Physics Seminar, College of Allied Health, University of Oklahoma Health Sciences Center
- 1979-1981 Lecturer, Annual Radiology Grand Rounds, Oklahoma Teaching Hospitals
- 1980-1985 Lecturer, Pediatric Surgery Core Lecture Series in Pediatric Radiology, Oklahoma Children's Memorial Hospital
- 1981-1986 Lecturer, Neurology/Pediatric Neuroradiology Lecture Series, Oklahoma Teaching Hospitals
- 1982-1985 Participant, Senior Radiology Resident Pre-Board Examinations, University of Oklahoma College of Medicine
- 1982-1986 Lecturer, Pediatric House Staff Core Lecture Series in Pediatric Radiology, Oklahoma Children's Memorial Hospital

- 1983-1986 Course Developer and Director, Resident Final Examination in Pediatric Radiology, University of Oklahoma College of Medicine
- 1985-1986 Oklahoma Diagnostic Imaging Center Lecture Series, Course Co-Developer and Co-Director
- 1985-1986 Oklahoma Teaching Hospitals Department of Radiological Sciences, Magnetic Resonance Imaging Lecture Series (Course Developer and Director)

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- 1986 "Magnetic Resonance Imaging for the Referring Physician", Continuing Medical Education Seminar, Program Co-Director, Session Moderator, and Lecturer, Oklahoma Teaching Hospitals and the University of Oklahoma College of Medicine
- 1986-2000 Daily Neuroradiology Case Review and Consultation with Pediatric and Adolescent Medicine, Neurology, Neurosurgery, Radiology, Oncology, Radiation Therapy, Orthopedic, ORL/Head and Neck Surgery, Ophthalmology, Plastic Surgery, Oral Surgery, and Neuropathology Staff, Fellows, Residents, Medical Students, and visitors, Children's Hospital, Boston, MA
- 1986-2000 Weekly Pediatric Neurology-Neuroradiology Rounds with Staff, Fellows, Residents, Medical Students, and visitors, Conference Co-Leader, Children's Hospital, Boston, MA
- 1986-2000 Weekly Pediatric Neurosurgery-Neuroradiology Rounds with Staff, Fellows, Residents, Medical Students, and visitors, Conference Co-Leader, Children's Hospital, Boston, MA
- 1986-2000 Weekly Pediatric Neuroncology-Neuroradiology Rounds with Pediatric Oncology, Radiation Oncology, and Neurosurgery Staff, Fellows, Residents, Medical Students, and visitors (The Children's Hospital and Dana-Farber Cancer Institute), Conference Co-Leader, Children's Hospital, Boston, MA
- 1986-2000 Weekly Longwood Medical Area Neuroradiology Conference with Staff, Fellows, Residents, Medical Students, and visitors (The Children's Hospital, Brigham & Women's Hospital, Beth Israel Hospital, New England Deaconess Hospital, Dana-Farber Cancer Institute), Conference Co-Leader, Children's Hospital, Boston, MA
- 1986-2000 Monthly Pediatric ORL/Head & Neck Radiology Rounds with Staff, Fellows, Residents, Medical Students, and visitors, Conference Co-Leader, Children's Hospital, Boston, MA
- 1986-2000 Monthly Pediatric Radiology Difficult Case Conference (Risk Management and Quality Improvement) with Staff, Fellows, Residents, Medical Students, and visitors, Children's Hospital, Boston, MA
- 1986-2000 Monthly Boston Area Neuroradiology Club Case Conference with Staff, Fellows, Residents, Medical Students, and visitors (Massachusetts General Hospital)

- 1986-2000 Pediatric Neuroradiology Annual Lecture Series, Course Co-Director and Lecturer, for Staff, Fellows, Residents, Medical Students, and visitors.
- 1986-2000 Pediatric Neuroradiology Introductory Lectures for Harvard Medical Students and Rotating Radiology Residents, Radiology, Children's Hospital, Boston, MA
- 1986-1988 Cardiac Radiology Lecture Series, Course Developer and Lecturer, Radiology, Children's Hospital, Boston, MA
- 1986-1990 Magnetic Resonance Imaging Lecture Series, Course Developer, Director, and Lecturer, Radiology, Children's Hospital, Boston, MA

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- 2000 Basic Technical and Biological Principles of Magnetic Resonance Imaging Lecture Series, Department of Radiology, Beth Israel Deaconess Medical Center, Boston, MA
- 2000 Pediatric Neuroradiology Resident Pre-Board Review, Department of Radiology, Beth Israel Deaconess Medical Center, Boston, MA
- 2000- Pediatric Neuroradiology Lectures, Neuroradiology Lecture Series, Stanford University Medical Center, Palo Alto, CA.
- 2000- Annual Pediatric Neuroradiology Lecture Series for Neurology Residents & Fellows, Stanford University Medical Center, Palo Alto, CA.
- 2001- Annual Pediatric Neuroradiology Lecture Series for Neurosurgery Residents and Fellows Stanford University Medical Center, Palo Alto, CA.
- 2001- Pediatric Head & Neck Imaging Lecture Series for ORL/Head & Neck Residents and Fellows, Stanford University Medical Center, Palo Alto, CA.
- 2001- Pediatric Neuroradiology Lectures, Pediatric Radiology Lecture Series, Department of Radiology, Stanford University Medical Center, Palo Alto, CA.

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Original Articles:

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4. Barnes P, Reynolds A, Galloway D, Pollay M, Leonard J, Prince J. Digital myelography of spinal dysraphism in infancy. *American Journal of Neuroradiology* 1984; 5:208-211; *American Journal of Roentgenology* 1984; 142:1247-1252.

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10. Noorani P, Bodensteiner J, Barnes P. Colpocephaly: frequency and associated findings. *Journal of Child Neurology* 1988;3:100-104.
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12. Schick R, Jolesz F, Macklis J, Barnes P. Magnetic resonance diagnosis of dural venous sinus thrombosis complicating L-asparaginase therapy. *J Computerized Medical Imaging and Graphics* 1989;13:319-327.
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14. Healey EA, Barnes PD, Kupsky WJ, Scott RM, Sallan SE, Black PM, Tarbell NJ. The prognostic significance of postoperative residual tumor in ependymoma. *Neurosurgery* 1991;28:666-671.

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18. Scott RM, Barnes P, Kupsky W, Adelman L. Cavernous angiomas of the central nervous system in children. *J Neurosurg* 1992;76:38-46.

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- directed stereotactic neurosurgery: use of image fusion with computerized tomography to enhance spatial accuracy. *J Neurosurg* 1995;83(2):271-276.
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