

In the
United States Court of Appeals
For the Seventh Circuit

No. 17-1810

S.V. GOPALRATNAM, *et al.*,

Plaintiffs-Appellants,

v.

HEWLETT-PACKARD COMPANY, *et al.*,

Defendants-Appellees.

Appeal from the United States District Court for the
Eastern District of Wisconsin.
No. 2:13-cv-618 — **Pamela Pepper**, *Judge.*

ARGUED DECEMBER 1, 2017 — DECIDED DECEMBER 15, 2017

Before BAUER, FLAUM, and ROVNER, *Circuit Judges.*

FLAUM, *Circuit Judge.* Plaintiffs' son tragically perished in a fire at plaintiffs' home in June 2010. Believing that the fire was caused by a defective lithium ion battery cell from their son's laptop, plaintiffs filed a products liability suit against separate manufacturers of the laptop, battery pack, and individual battery cells. Plaintiffs supported their causation theory solely through testimony from two expert witnesses, whom defendants later moved to exclude under Federal Rule

of Evidence 702 and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). The district court granted defendants' motions to exclude, and therefore entered summary judgment in their favor. Plaintiffs now appeal the district court's ruling. We affirm.

I. Background

A. Factual Background

On June 17, 2009, Arun Gopalratnam, a twenty-three year-old college student at the University of Wisconsin-Milwaukee, purchased a laptop computer manufactured by defendant Hewlett-Packard Company ("HP"). The laptop contained a battery pack manufactured by defendant DynaPack Technology Corporation ("DynaPack"), which in turn held three cylindrical-shaped lithium ion battery cells manufactured by defendant Samsung SDI Company, Limited ("Samsung").

Approximately one year later, on June 4, 2010, the Menomonee Falls, Wisconsin Fire Department responded to a major fire in a basement bedroom of the home of Arun's parents, plaintiffs S.V. and Hemalatha Gopalratnam. After the fire was extinguished, firefighters discovered Arun deceased on the floor of the room. A later autopsy classified smoke inhalation as the cause of death. The medical examiner discovered no evidence of pre-fire injury or disease, and a toxicology screen evidenced no drugs or alcohol in Arun's system.

Due to Arun's death, Special Agent Antonio H. Martinez of Wisconsin's Department of Criminal Investigation was assigned to conduct a fire investigation. Special Agent Martinez concluded that the fire originated in the basement bedroom where Arun's body was located. Although Special Agent

Martinez excluded multiple potential sources of the blaze (including the home's electrical and gas meters, electrical distribution panels, and gas-fueled furnaces, as well as the electrical plugs, light switch, and ceiling light fixture in the bedroom), he could not ascertain the fire's ultimate cause. His investigation did not eliminate, however, "a possible fire within the mattress area" of the bedroom "that extended into the ceiling area."

During the fire investigation, investigators collected burnt debris found on the remnants of the bedroom mattress. The remains of Arun's HP laptop and Nokia cell phone, including two of the three laptop battery cells, were found amongst this debris. Investigators then shoveled the remaining bedroom debris out the bedroom window and into random piles in plaintiffs' yard. The third laptop battery cell was later found in one of these piles.

B. Procedural Background

On June 4, 2013, plaintiffs filed suit in the Eastern District of Wisconsin against HP and its insurer, defendant ABC Insurance Company, alleging negligence, strict products liability, and breach of warranty. Plaintiffs claimed that a defective lithium ion battery cell in Arun's laptop caused the fire that led to their son's death. On July 16, 2013, HP filed a third-party complaint against DynaPack and Samsung. On October 31, 2014, plaintiffs amended their complaint to include DynaPack and Samsung as defendants.

Plaintiffs supported their causation theory with two expert witnesses. First, plaintiffs retained Dr. Daniel H. Doughty, who holds a Ph.D in inorganic chemistry, as an ex-

pert on “battery safety.” In addition, plaintiffs retained Michael F. Hill, Sr., a retired Certified Fire Investigator with the Illinois Chapter of the International Association of Arson Investigators, to opine about the “cause and origin” of the fire. Both Doughty and Hill issued expert reports and were deposed by defendants during the course of expert discovery.

1. *Doughty’s Expert Report*

Doughty physically examined the cell phone battery and three laptop battery cells recovered from the fire. From this examination, Doughty noted that the two laptop cells found on the bedroom mattress (which Doughty labeled as “Cell B” and “Cell C”) had retained their cylindrical dimensions and internal contents throughout the fire (as did the cell phone battery). In contrast, Doughty observed that the third laptop cell found in the debris pile in plaintiffs’ yard (which Doughty labeled as “Cell A”) had ejected its contents and warped into an elliptical shape.

Doughty then set out to explain the difference between Cell A and Cells B and C. Doughty opined that the appearance of Cell A was typical for a cell that had experienced severe “thermal runaway,” which he defined as “the condition when the rate of heat generation inside the battery cell ... is greater than [the] rate of heat dissipation.” According to Doughty, “[a] battery cell is an energy storage device.” If battery energy “is released in a controlled manner (i.e., normal discharge), the device is safe.” If the energy is released “in a rapid, uncontrolled manner,” however, “[a]dditional heat and gas are produced” that can trigger thermal runaway. This produces “very high temperature internal to the cell” which can cause the cell to “vent[] violently or explode[.]” Doughty

further stated that the hot “ejecta” from an exploding cell “provides a ready source of ignition of flammable materials.”

Doughty outlined several potential causes of thermal runaway, including: (1) “electrical abusive conditions” (such as an external short circuit, overcharge, or overdischarge); (2) “mechanical abusive conditions” (such as shock, vibration, or penetration); (3) “high temperature abusive conditions,” including heat from an *external* fire; and (4) “flaws from within the cell” that cause an *internal* short circuit.

Doughty excluded electrical abuse because there was no evidence of an external short circuit—Arun’s laptop was not plugged in at the time of the fire, and overcharge is usually a benign event. He further excluded mechanical abuse based upon his inspection of the laptop and the fact that it had been tested against existing safety standards, including tests for vibration, shock, and impact.

Regarding the possibility of overheating from an external fire, Doughty stated that multiple design elements within the laptop, battery pack, and battery cells were engineered to protect against excessive external temperatures. Importantly, Doughty further opined that, based upon existing literature, the exposure of lithium ion cells to external fire causes “predictable results.” He noted that the design of Arun’s laptop battery pack placed the cells close together and in a straight line. Thus, Doughty reasoned, all of the cells would have been exposed to the same external heat conditions from the fire. Therefore, Doughty concluded that if external fire was the cause, one would expect to see a uniform temperature response from all three cells. This, however, was not the case, as deformation in Cell A significantly differed from Cells B and

C. To Doughty, this suggested a “different failure mechanism.”

Doughty concluded that the rate of release of the stored energy in Cell A was “much more rapid” than the other cells, and that the “[v]ery rapid gas generation” that created such a substantial pressure rise was “only consistent with an internal short circuit” that led to thermal runaway. Doughty went on to state that internal short circuits are known to be caused by “[f]laws within the cell,” such as “debris, foreign objects, contaminants, wrinkles in the electrode, etc.” These flaws can exist even in “approved cell designs” and “in cells that have passed safety tests.” Doughty thus concluded that the internal fault was caused by “either a manufacturing defect in the cell that ... caus[ed] an internal short circuit, or a failure of the computer’s control/safety circuitry to function as designed ... which in turn caused an internal short circuit in the cell.”

2. *Hill’s Expert Report*

Hill, the Fire Investigator, conducted site studies of plaintiffs’ home on two occasions in the weeks after the fire. He also reviewed physical evidence retrieved from the home, as well as reports, photographs, x-rays, diagrams, and blueprints compiled by the Menomonee Falls Fire and Police Departments. Hill concluded that: (1) the fire originated on the top of the bed in the basement bedroom; (2) the “most probable” ignition source was the laptop battery; and (3) the fire was accidental.

3. *Proceedings Below*

On June 24, 2016, defendants separately moved to exclude the testimony of both Doughty and Hill under Federal Rule of Evidence 702 and *Daubert*. Defendants contended that Hill

and Doughty were unqualified to render expert opinions and that their respective opinions were unreliable. Defendants further moved for summary judgment on the theory that, without their experts, plaintiffs could not prove causation in any of their causes of action.

The district court granted defendants' motions on March 21, 2017. Although the court found both Hill and Doughty sufficiently qualified, it nonetheless deemed their opinions unreliable. Because the court excluded their expert testimony, it further found that plaintiffs could not support their claim that a defective lithium ion battery cell led to their son's death. As a result, the court granted summary judgment in favor of defendants. This appeal followed.

II. Discussion

A. Principles of Law

1. *The Admissibility of Expert Testimony*

"Any assessment of the admissibility of expert witness testimony begins with Federal Rule of Evidence 702 and the Supreme Court's opinion in *Daubert*, as together they govern the admissibility of expert witness testimony." *Krik v. Exxon Mobil Corp.*, 870 F.3d 669, 673 (7th Cir. 2017). This is true even when, as here, "our jurisdiction rests on diversity." *C.W. ex rel. Wood v. Textron, Inc.*, 807 F.3d 827, 834 (7th Cir. 2015); *see also Wallace v. McGlothan*, 606 F.3d 410, 419 (7th Cir. 2010) (noting that "standards for admitting expert evidence" are "matters that fall on the procedural side of the *Erie* divide" and are thus governed by federal law). Rule 702 states:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702.

In *Daubert*, the Supreme Court interpreted Rule 702 to require "the district court to act as an evidentiary gatekeeper, ensuring that an expert's testimony rests on a reliable foundation and is relevant to the task at hand." *Krik*, 870 F.3d at 674 (citing *Daubert*, 509 U.S. at 589).¹ This is due to the fact that

¹ Technically, *Daubert* interpreted a prior version of Rule 702, which only stated:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

509 U.S. at 588 (quoting the prior rule). Rule 702 was substantially revised in 2000 "to 'affirm[] the trial court's role as gatekeeper and provide[] some general standards that the trial court must use to assess the reliability and

“[e]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it.” *Daubert*, 509 U.S. at 595 (quoting Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence Is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 632 (1991)). This is particularly true in cases such as this involving expert testimony “on the ultimate issue of fact.” See *United States v. Navarro*, 90 F.3d 1245, 1260 n.14 (7th Cir. 1996) (quoting *United States v. Boyd*, 55 F.3d 667, 672 (D.C. Cir. 1995)).

The district court’s “‘gatekeeping’ obligation ... applies not only to testimony based on ‘scientific’ knowledge, but also to testimony based on ‘technical’ and ‘other specialized’ knowledge.” *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 141 (1999); see also *Lees v. Carthage Coll.*, 714 F.3d 516, 521 (7th Cir. 2013) (“[T]he *Daubert* analysis applies to *all* expert testimony under Rule 702, not just scientific testimony.”).

In performing its gatekeeper role under Rule 702 and *Daubert*, “the district court must engage in a three-step analysis before admitting expert testimony. It must determine whether the witness is qualified; whether the expert’s methodology is scientifically reliable; and whether the testimony

helpfulness of proffered expert testimony.” *Dhillon v. Crown Controls Corp.*, 269 F.3d 865, 869 (7th Cir. 2001) (alteration in original) (quoting Fed. R. Evid. 702 advisory committee’s note to 2000 amendment). These “general standards” derive from *Daubert* and its progeny. See Fed. R. Evid. 702 advisory committee’s note to 2000 amendment. Thus, even though “[a]t this point, Rule 702 has superseded *Daubert*, ... the standard of review that was established for *Daubert* challenges is still appropriate.” *United States v. Parra*, 402 F.3d 752, 758 (7th Cir. 2005); see also *Manpower, Inc. v. Ins. Co. of Pa.*, 732 F.3d 796, 806 (7th Cir. 2013) (“*Daubert* interpreted an earlier version of Rule 702, but it remains the gold standard for evaluating the reliability of expert testimony and is essentially codified in the current version of Rule 702.”).

will ‘assist the trier of fact to understand the evidence or to determine a fact in issue.’” *Myers v. Ill. Cent. R.R. Co.*, 629 F.3d 639, 644 (7th Cir. 2010) (quoting *Ervin v. Johnson & Johnson, Inc.*, 492 F.3d 901, 904 (7th Cir. 2007)); see also *Bielskis v. Louisville Ladder, Inc.*, 663 F.3d 887, 893–94 (7th Cir. 2011). In other words, the district court must evaluate: (1) the proffered expert’s *qualifications*; (2) the *reliability* of the expert’s methodology; and (3) the *relevance* of the expert’s testimony. Steps one and three are not at issue here; the district court found both Doughty and Hill to be qualified, and their testimony not only helpful, but necessary to prove plaintiffs’ theory of liability. See *Gopalratnam v. Hewlett-Packard Co.*, No. 13-cv-618, 2017 WL 1067768, at *3 (E.D. Wis. Mar. 21, 2017) (“The court finds that the plaintiffs need expert testimony to prove their claim that a defective cell in the battery pack in Arun’s laptop caused the fire.”). Regarding step two, however, the court concluded that both expert opinions were unreliable.

According to our circuit’s precedent, courts should evaluate the reliability of a qualified expert’s testimony by considering, amongst other factors: “(1) whether the proffered theory can be and has been tested; (2) whether the theory has been subjected to peer review; (3) whether the theory has been evaluated in light of potential rates of error; and (4) whether the theory has been accepted in the relevant scientific community.” *Krik*, 870 F.3d at 674 (quoting *Baugh v. Cuprum S.A. de C.V.*, 845 F.3d 838, 844 (7th Cir. 2017)). In addition, the Rule 702 advisory committee’s note to the 2000 amendment outlines other benchmarks relevant in assessing an expert’s reliability:

- (5) whether “maintenance standards and controls” exist; (6) whether the testimony relates to

“matters growing naturally and directly out of research they have conducted independent of the litigation,” or developed “expressly for purposes of testifying”; (7) “[w]hether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion”; (8) “[w]hether the expert has adequately accounted for obvious alternative explanations”; (9) “[w]hether the expert is being as careful as he would be in his regular professional work outside his paid litigation consulting”; and (10) “[w]hether the field of expertise claimed by the expert is known to reach reliable results for the type of opinion the expert would give.”

Fuesting v. Zimmer, Inc., 421 F.3d 528, 534–35 (7th Cir. 2005), *opinion vacated in part on reh’g*, 448 F.3d 936 (7th Cir. 2006) (quoting Fed. R. Evid. 702 advisory committee’s note to 2000 amendment).

“Importantly, this list is neither exhaustive nor mandatory.” *Textron*, 807 F.3d at 835; *see also Kumho Tire*, 526 U.S. at 150 (“*Daubert* makes clear that the factors it mentions do *not* constitute a ‘definitive checklist or test.’” (quoting *Daubert*, 509 U.S. at 593)); *Krik*, 870 F.3d at 674 (“Despite the list, we have repeatedly emphasized that ‘no single factor is either required in the analysis or dispositive as to its outcome.’” (quoting *Smith v. Ford Motor Co.*, 215 F.3d 713, 719 (7th Cir. 2000))); *United States v. Cruz-Velasco*, 224 F.3d 654, 660 (7th Cir. 2000) (“Although the *Daubert* Court identified a number of factors to be considered when evaluating the admissibility of expert testimony ... these factors do not establish a definitive checklist.”). Instead, “a trial court *may* consider one or more of the

more specific factors that *Daubert* mentioned when doing so will help determine that testimony's reliability." *Kumho Tire*, 526 U.S. at 141.

Ultimately, "there are many different kinds of experts, and many different kinds of expertise." *Id.* at 150. The test of reliability, therefore, "is 'flexible,' and *Daubert's* list of specific factors neither necessarily nor exclusively applies to all experts or in every case." *Id.* at 141 (quoting *Daubert*, 509 U.S. at 594); see also *Textron*, 807 F.3d at 835 ("Ultimately, reliability is determined on a case-by-case basis."). Rather, "[t]he district court may apply these factors flexibly as the case requires." *Krik*, 870 F.3d at 674; see also *Kumho Tire*, 526 U.S. at 142 ("[T]he law grants a district court the same broad latitude when it decides *how* to determine reliability as it enjoys in respect to its ultimate reliability determination."). In the end, "the gatekeeping inquiry must be 'tied to the facts' of a particular 'case,'" *Kumho Tire*, 526 U.S. at 150 (quoting *Daubert*, 509 U.S. at 591), and "the reliability analysis should be geared toward the precise sort of testimony at issue and not any fixed evaluative factors." *Lees*, 714 F.3d at 521.

At the same time, this flexibility is not without limit. "[T]he district court's role as gatekeeper does not render the district court the trier of all facts relating to expert testimony. ... The jury must still be allowed to play its essential role as the arbiter of the weight and credibility of expert testimony." *Stollings v. Ryobi Techs., Inc.*, 725 F.3d 753, 765 (7th Cir. 2013) (citations omitted). Rather, "Rule 702's reliability elements require the district judge to determine only that the expert is providing testimony that is based on a correct application of a reliable *methodology* and that the expert considered

sufficient data to employ the methodology.” *Id.* at 766 (emphasis added). This examination “does not ordinarily extend to the reliability of the *conclusions* those methods produce—that is, whether the conclusions are unimpeachable.” *Id.* at 765 (emphasis added). In other words, “[a]n expert may provide expert testimony based on a valid and properly applied methodology and still offer a conclusion that is subject to doubt. It is the role of the jury to weigh these sources of doubt.” *Id.* at 766.

The focus, therefore, “must be solely on principles and methodology, not on the conclusions that they generate.” *Daubert*, 509 U.S. at 595; *see also Ford Motor Co.*, 215 F.3d at 718 (“[W]e emphasize that the court’s gatekeeping function focuses on an examination of the expert’s methodology.”). “The soundness of the factual underpinnings of the expert’s analysis and the correctness of the expert’s conclusions based on that analysis are factual matters to be determined by the trier of fact, or where appropriate, on summary judgment.” *Ford Motor Co.*, 215 F.3d at 718; *see also Manpower, Inc. v. Ins. Co. of Pa.*, 732 F.3d 796, 806 (7th Cir. 2013) (“Reliability ... is primarily a question of the validity of the methodology employed by an expert, not the quality of the data used in applying the methodology or the conclusions produced.”). “The district court usurps the role of the jury, and therefore abuses its discretion, if it unduly scrutinizes the quality of the expert’s data and conclusions rather than the reliability of the methodology the expert employed.” *Manpower*, 732 F.3d at 806.

“This is not to say that an expert may rely on data that has no quantitative or qualitative connection to the methodology employed.” *Id.* at 808. Indeed, Rule 702 explicitly requires that expert testimony be “based on sufficient facts or data.” Fed.

R. Evid. 702. In the “quantitative” sense, “‘sufficient facts or data’ means ‘that the expert considered sufficient data to employ the methodology’”; “an opinion about an average gross sales price,” for example, “could not be reliably supported by evidence relating to sales to only one customer ‘because a single observation does not provide a sufficient basis for calculating an average.’” *Manpower*, 732 F.3d at 808 (quoting *Stollings*, 725 F.3d at 766). To be “qualitatively” adequate, “an expert must employ ‘those kinds of facts or data’ on which experts in the field would reasonably rely.” *Id.* at 809 (quoting Fed. R. Evid. 703).

We have recognized that the line between conclusions and methodology “is not always an easy line to draw.” *Id.* at 806. “[C]onclusions and methodology are not entirely distinct from one another. Trained experts commonly extrapolate from existing data.” *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997). Nevertheless, “[t]he critical inquiry is whether there is a *connection* between the data employed and the opinion offered; it is the opinion connected to existing data ‘only by the *ipse dixit* of the expert’ that is properly excluded under Rule 702.” *Manpower*, 732 F.3d at 806 (quoting *Joiner*, 522 U.S. at 146) (first emphasis added). Said another way, there must be a “rational connection between the data and the opinion.” *Id.* at 809.

2. *Standard of Review*

“It is well established that issues related to expert opinion testimony are matters of law to be determined by the trial judge.” *Bradley v. Brown*, 42 F.3d 434, 436 (7th Cir. 1994). This is “because of the trial judge’s first-hand exposure to the witnesses and the evidence as a whole, and because of the judge’s familiarity with the case and ability to gauge the impact of the

evidence in the context of the entire proceeding.” *United States v. Walton*, 217 F.3d 443, 449 (7th Cir. 2000) (quoting *United States v. Van Dreel*, 155 F.3d 902, 905 (7th Cir. 1998)). Indeed, we have colorfully said that “[a]ppellants who challenge evidentiary rulings of the district court are like rich men who wish to enter the Kingdom: their prospects compare with those of camels who wish to pass through the eye of the needle.” *Id.* (alteration in original) (quoting *United States v. Coleman*, 179 F.3d 1056, 1061 (7th Cir. 1999)).

Therefore, “[w]hether the district court applied the *Daubert* framework properly is a question we review de novo,” but we review the ultimate decision “to exclude or admit the expert witness testimony for an abuse of discretion only.” *Krik*, 870 F.3d at 673. In other words, “[i]f the district court properly applied the *Daubert* analysis, then ‘we will not disturb the district court’s findings unless they are manifestly erroneous.’” *United States v. Adame*, 827 F.3d 637, 645 (7th Cir. 2016) (quoting *Lapsley v. Xtek, Inc.*, 689 F.3d 802, 809 (7th Cir. 2012)). But “if the district court failed to conduct a *Daubert* analysis, then we review *de novo* whether the expert’s testimony was admissible under Federal Rule of Evidence 702.” *Id.*

“A decision is an abuse of discretion only if ‘no reasonable person would agree with the decision made by the trial court.’” *Smith v. Hunt*, 707 F.3d 803, 807–08 (7th Cir. 2013) (quoting *United States v. Thomas*, 453 F.3d 838, 845 (7th Cir. 2006)). This can occur when a court “commits ‘a serious error of judgment, such as reliance on a forbidden factor or failure to consider an essential factor,’” *Ford Motor Co.*, 215 F.3d at 717 (quoting *Powell v. AT&T Comm., Inc.*, 938 F.2d 823, 825 (7th Cir. 1991)), when a court treats a single *Daubert* factor as dis-

positive, *see id.* at 720–21, or when “the record contains no evidence upon which the trial judge rationally could have based his decision.” *United States v. Savage*, 505 F.3d 754, 760 (7th Cir. 2007).

Notably, “[t]he party seeking to introduce the expert witness testimony bears the burden of demonstrating that the expert witness testimony satisfies the [*Daubert*] standard by a preponderance of the evidence.” *Krik*, 870 F.3d at 673; *see also Lewis v. CITGO Petroleum Corp.*, 561 F.3d 698, 705 (7th Cir. 2009); Fed. R. Evid. 702 advisory committee’s note to 2000 amendment (“[T]he admissibility of all expert testimony is governed by the principles of Rule 104(a). Under that Rule, the proponent has the burden of establishing that the pertinent admissibility requirements are met by a preponderance of the evidence.”).

B. The district court applied the proper legal standard when it barred the testimony of plaintiffs’ experts

To apply the proper legal standard, “judges merely need to follow *Daubert* in making a Rule 702 determination.” *Naeem v. McKesson Drug Co.*, 444 F.3d 593, 608 (7th Cir. 2006). “While the *Daubert* standard does not have to be recited mechanically, ‘it is nonetheless crucial that a *Daubert* analysis of some form in fact be performed.’” *Id.* (quoting *Fuesting*, 421 F.3d at 535).

“[T]he court must provide more than just conclusory statements of admissibility or inadmissibility to show that it adequately performed its gatekeeping function.” *Gayton v. McCoy*, 593 F.3d 610, 616 (7th Cir. 2010). “A more searching *Daubert* analysis is required.” *Fuesting*, 421 F.3d at 535. In

Metavante Corp. v. Emigrant Savings Bank, for example, we concluded that the district court did not properly adhere to the *Daubert* framework where the judge issued a one sentence admissibility determination that did not even reference *Daubert* by name. 619 F.3d 748, 760 (7th Cir. 2010). We issued the same holding in *Naeem*, where we noted “the district court’s one sentence, stating that [the expert] ha[d] sufficient expertise, [was] not enough to show that the district court applied the *Daubert* standard.” 444 F.3d at 608. Likewise, in *Fuesting*, “[a]lthough the district court offered a relatively lengthy discussion of [the expert’s] credentials, the court’s *Daubert* factor analysis,” which merely made a passing reference to the expert’s deposition, “was not sufficient.” 421 F.3d at 535.

In contrast, we have found that the district court applied the proper legal standard when it “accurately outlin[ed] the *Daubert* framework” at the outset of its analysis and “conducted an in-depth review of the relevant studies the experts relied upon.” See *Textron*, 807 F.3d at 835.

Here, the district court applied the proper legal standard. The court explicitly recognized that “[t]he admissibility of expert testimony is governed by Federal Rule of Evidence 702 and *Daubert*.” *Gopalratnam*, 2017 WL 1067768, at *4. It prefaced its *Daubert* analysis with a two-and-a-half-page discussion of the applicable test, which highlighted *Daubert*’s dual focus on relevance and reliability, including the most commonly utilized reliability factors. The court’s application of *Daubert*’s reliability standard to the facts of this case continued for another six pages. All told, such an inquiry stands in stark contrast to cases like *Metavante*, *Naeem*, and *Fuesting*. Thus, we will apply an abuse of discretion standard to our review of the court’s

ultimate determination to exclude Doughty and Hill's testimony.

C. The district court did not abuse its discretion in excluding the expert witness testimony of plaintiffs' experts

1. The Testimony of Dr. Daniel Doughty

Based upon his written report and deposition testimony, we can fairly characterize Doughty's expert opinions as follows:

- (1) An "internal fault" in one of the battery cells (Cell A) in Arun's computer caused an internal short circuit that triggered thermal runaway such that the cell ejected its internal contents, which created a "potent fire hazard"; and
- (2) The internal fault was caused "by either a manufacturing defect in the cell" or "a failure of the computer's control/safety circuitry."

Said another way, Doughty rendered expert opinions regarding both the cause of the *fire* (an internal fault in Cell A) and the cause of the *internal fault* itself (a manufacturing defect in the cell or failure of the computer's control/safety circuitry).

Pursuant to *Daubert*, it was "not the trial court's role to decide" whether these opinions were ultimately correct. *See Ford Motor Co.*, 215 F.3d at 719. Rather, the court was limited to determining "whether the methodology underlying that testimony [was] sound." *See id.* On this score, the district court ruled that Doughty's opinions were unreliable because their "underlying bases" were improperly based upon "speculation" and "unfounded inferences." *Gopalratnam*, 2017 WL

1067768, at *5, *10. We conclude that this ruling was not an abuse of discretion, and address each of Doughty's opinions in turn.

a. Doughty's opinion that an "internal fault" in one of the battery cells caused the fire

During his deposition, Doughty explained that his opinion that an internal fault led to the failure of Cell A was based upon three facts:

- (1) Only Cell A ejected its internal contents, whereas Cells B and C, as well as the cell phone battery, did not;
- (2) Cell A warped into an elliptical shape, whereas Cells B and C, as well as the cell phone battery, retained their dimensions; and
- (3) Cell A acted as a projectile.

Central to the relevancy of Doughty's first two factual underpinnings were their differential nature. That is, what mattered (at least to Doughty) was not just that Cell A ejected its contents and warped into an elliptical shape, but also that the other battery cells *did not*.² Admittedly, these findings were not speculative; they are well supported by the physical evidence recovered from plaintiffs' home. Indeed, based upon

² For example, Doughty's report states "[o]nly Cell A had ejected its contents, whereas all the other cells (Cell B, Cell C or the Nokia cell phone battery) did not eject their contents," and "[t]he [CT scan of the cells taken after the fire] shows the distortion of the Cell A can, which now has an elliptical shape instead of being circular. The external cell dimensions of Cells B & C appear to have no distortion, and dimensions appear nearly the same as as-manufactured cells."

the present record, it does not appear that either fact is disputed by the parties.

Nevertheless, Doughty's reliability fails when it comes to the method by which he derived conclusions *from* these underlying events. In his expert report, Doughty determined that the cells' differential appearance suggested that one cell—Cell A—“had a different failure mechanism.” This inference, however, relied almost entirely upon Doughty's premise that the exposure of cells to *external* fire (as opposed to an internal fault) “cause[s] predictable results” amongst the cells. Doughty reasoned that, during the fire in plaintiffs' home, all of the cells would have been exposed to the same external heat conditions. Thus, according to Doughty, “one would expect to see relatively uniform temperature response of all three cells.” By extension, because the condition of one cell was “clearly different” than the other cells, Doughty concluded that the “temperature history of [that cell] was unique.” Having previously excluded other potential causes (such as electrical and mechanical abuse), “the only trigger ... that remain[ed was] an *internal* flaw in the cell that [led] to rapid thermal runaway.” (emphasis added).

However, the record indicates that Doughty's central underlying premise—that exposure of cells to external fire causes predictable, uniform results—was not only unsupported, but in fact contrary to generally accepted battery science. Defendants' own battery expert testified to the following:

Q. Why was the thermal runaway of Cell A more energetic given that it should have been at the same or similar charge as Cell B and C?

...

A. ... [W]hen you expose cells to a fire there's a certain amount of randomness or stochasticity to the failure event [T]here is a certain amount of randomness to how batteries fail when they're exposed to fire, and especially an uncontrolled event [such as the fire at issue here] So I think that, you know, you've got the stochasticity of how lithium-ion batteries fail, you've got the, the unknown variables as far as how the fire encroached on the laptop, which cells got heated up first. So I mean, when you ask me how to explain it, I explain it by saying that there's a lot of randomness and differences other than state of charge that are going to affect whether a cell expels its contents or does not.

In his written report, Doughty supported his premise only by citing to his own 2004 article, which he co-authored with E. Peter Roth, where he tested the thermal response of lithium-ion cells to external heat. Defendants' expert, however, challenged the compatibility of Roth's findings with Doughty's premise:

[I]n fact, in the Roth report that we were just talking about ... they took two identical 18650 cells,³ they exposed them to exactly the same heat source and exactly the same state of charge, and one expelled its contents and one did not. They did the same thing at 80 percent state of

³ The laptop battery cells at issue in this case were also 18650 cells.

charge, one expelled its contents, one didn't These are laboratory tests, so where things are done as best as possible to keep everything the same. And you still see a difference on how things fail.

This observation is confirmed by the Roth article itself, which states:

Two cells at 100% [state-of-charge] and two cells at 60% [state-of-charge] were run in heating tests to 200°C. *In these tests, two cells vented, saving the respective cans, and two cells did not, causing the can lid to fail and the roll to eject. There was a result each way, at each [state-of-charge].* It appears that in instances where there was can, or seal, or vent damage which could cause the cell to leak prematurely, then the cell did leak prematurely, and the cell was eventually observed to vent through the machined vent, and the can was saved from overpressure. In the other two, normal cases where there was no premature leakage, the machined vent never opened, and the case and roll were destroyed by overpressure.

E. Peter Roth et al., Sandia Nat'l Labs., *Advanced Technology Development Program for Lithium-Ion Batteries: Thermal Abuse Performance of 18650 Li-Ion Cells* 35 (2004), <https://pdfs.semanticscholar.org/7c66/2ecf8d3c4830c84283f225504e5b2f454ba8.pdf> (emphasis added). Doughty's reliance on the Roth study, therefore, is misplaced.

During his deposition, Doughty expanded his list of academic support beyond the Roth article to include a 2011 study

conducted by Celina Mikolajczak and others at Exponent Failure Analysis Associates, that also tested the response by lithium-ion cells to external fire:

Q. All right. Is there any other literature that you can identify by actual name that someone could go look at and review that also supports that other than the paper you co-wrote [with Roth] in 2004?

A. Celina's report has a number of tests, fire tests of batteries intended to evaluate shipping conditions, and she has—they have a number of tests at Exponent.

Q. And you're saying that that report, if I go read it, and you're referring to, "Lithium-Ion Batteries Hazard and Use Assessment," will include in it the proposition that lithium-ion battery cells that are exposed to the same conditions in a fire should behave the same way?

A. That is—that—the consistency of her results points to that conclusion. I don't know that she specifically mentions that conclusion, but the consistency of the results will point to that conclusion.

As with the Roth study, however, Mikolajczak's study indicates the opposite. Mikolajczak's article includes statements such as:

[1] In a few tests, *some* cells ruptured their cases and expelled their contents. ... [and]

[2] Tests were also conducted on laptop battery packs that contained 18650 cells. In the first test, a single pack containing eight cells was tested. In this test, the packaged plastic began to be consumed by the propanol flame. Eventually, the cells began to vent with flames. Ultimately, *some* of the cells ruptured, ejecting and dispersing their contents.”

Celina Mikolajczak et al., The Fire Prot. Research Found., *Lithium-Ion Batteries Hazard and Use Assessment* 94–96 (2011), http://www.prba.org/wp-content/uploads/Exponent_Report_for_NFPA_-_20111.pdf (emphasis added).

Finally, during his deposition, Doughty also referenced an Underwriters Laboratories (“UL”) safety standard for lithium-ion cells used in laptop computers. Part of this standard includes a “projectile” test where a cell is positioned on a metal screen over an open flame and heated “until it explodes or the cell or battery has ignited and burned out.” Underwriters Labs. Inc., *Standard for Safety: Lithium Batteries* 20–21 (5th ed. 2012), http://www.by-choice.com/UL_1642_Ed_5_2012.pdf. To pass the test, no part of an exploding cell’s contents may “penetrate the wire screen such that some or all of the cell or battery protrudes through the screen.” *Id.* at 20. Doughty testified that the “good uniformity” of the results of such tests supported his theory that cells react uniformly when exposed to external flame.

Doughty, however, failed to provide any details regarding the UL test results. Regardless, the very premise of the projectile test undermines Doughty’s assertion, since the test explicitly contemplates that, in reaction to external heat, a subject battery may either “explode” or “ignite and burn out.” This

presents disparate, not uniform outcomes. In fact, such results are remarkably similar to the facts presented here, where Cell A expelled its internal contents while Cells B and C merely ignited. Thus, Doughty's reliance upon the UL projectile test is inapposite.

Contrary to Doughty's assertion, therefore, the Roth, Mikolajczak, and UL tests stand for the countervailing proposition that individual cells can react *differently* to external fire; some may expel their contents, while others may not. The central premise underlying Doughty's conclusion is thus faulty. Without this premise, Doughty cannot reliably draw the inference that the differential appearance between the cells in Arun's laptop was caused by a "different failure mechanism." In turn, Doughty's ultimate conclusion—that an internal flaw created the fire hazard that led to Arun's death—collapses.

Of course, Doughty was not bound to merely rely upon the Roth, Mikolajczak, and UL standards as sources; he could have cited to *any* reliable basis for his theory. He chose, however, to cite only contrary sources, and he did not conduct his own independent testing despite acknowledging the feasibility of doing so. In short, Doughty failed to "bridge the analytical gap" between the accepted differential appearance of the laptop battery cells and his contested conclusion that such differential appearance was caused by an internal fault in Cell A. See *Fuesting v. Zimmer, Inc.*, 362 F. App'x 560, 563 (7th Cir. 2010). That is, on the present record, there is no "rational connection" between Doughty's data and his opinion. See *Manpower*, 732 F.3d at 809; see also *United States v. Moore*, 521 F.3d 681, 684 (7th Cir. 2008) (asking the question: "Are [the expert's] inferential methods reliable?"); *Korte v. Exxonmobil*

Coal USA, Inc., 164 F. App'x 553, 557 (7th Cir. 2006) (affirming the district court's exclusion of expert causation testimony where the expert "formed his opinion without sufficient scientific evidence confirming the validity of [his] premise"); *Baker v. Dalkon Shield Claimants Tr.*, 156 F.3d 248, 253 (1st Cir. 1998) (indicating that "scientific premises" may be "so faulty that [they cannot] even be tendered to the jury for its consideration").

Equally problematic was the third factual basis for Doughty's "internal fault" opinion: that Cell A acted as a projectile. According to Doughty, the fact that Cell A was propelled away from the laptop served as further evidence of a "substantial pressure rise" and "rapid" release of stored energy that, in his view, was only consistent with an internal short circuit.

Unlike the differential appearance of cells after the fire, the issue of whether Cell A acted as a projectile was hotly contested by defendants. Doughty testified during his deposition that his finding was primarily based upon the fact that Cell A was found apart from the other laptop remnants:

It's my understanding that Cell A was found distant from the computer in the room, and therefore, if it had explosively disassembled, it's not uncommon to have the remnants of the cells be projectiles across the room

However, although it is true that Cell A was ultimately found in one of the debris piles outside plaintiffs' home, no one, including Doughty, could establish precisely *how* it got there, nor where it was located prior to cleanup. As a result, at least two possible alternatives cut against Doughty's theory. It is

entirely possible that Cell A was actually located *near* the other electronic remnants, but was simply missed by investigators and subsequently discarded with the remaining fire debris. It is equally possible that the cell originally came to rest away from the bed, but was moved there by fire suppression efforts (such as a running fire hose) rather than an explosive internal fault. Either alternative (or others) would undermine Doughty's finding that Cell A acted as a projectile, which would in turn further weaken his ultimate conclusion that an internal fault led to its failure. Of course, the actual explanation of how Cell A came to rest in the debris pile is irrelevant to our *Daubert* analysis. What matters is that Doughty failed to account for other possible explanations in arriving at his conclusion. *See* Fed. R. Evid. 702 advisory committee's note to 2000 amendment (finding "[w]hether the expert has adequately accounted for obvious alternative explanations" to be relevant "in determining whether expert testimony is sufficiently reliable to be considered by the trier of fact").

b. Doughty's opinion that the internal fault was caused "by either a manufacturing defect in the cell" or "a failure of the computer's control/safety circuitry"

Even less reliable was Doughty's second opinion that the internal fault in Cell A was specifically caused by a manufacturing defect in the cell or a failure in the computer's electrical circuitry. During his deposition, Doughty acknowledged that, even though electronic manufacturing processes undergo continuous development, he has never been to a laptop manufacturing plant, and has not visited a lithium-ion battery manufacturing facility since 2003 or 2004. He further admitted that, aside from what he read in the depositions of defend-

ants' employees, he had no independent knowledge of defendants' individual manufacturing processes, including their quality control measures. Indeed, he could not even identify the specific plant where the battery cells in this case were originally manufactured. In short, despite concluding that a manufacturing defect led to the alleged internal fault in this case, Doughty could not provide details as to *what* the specific defect was; *why* it transpired; *when* it occurred in the manufacturing process; or even *where* such manufacturing took place. Rather, Doughty simply opined that, because several manufacturing processes "*can cause*" an internal short circuit, such must have occurred here. This is simply too speculative to pass muster under *Daubert* and Rule 702. *See id.* (finding "[w]hether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion" to be relevant "in determining whether expert testimony is sufficiently reliable to be considered by the trier of fact").

Plaintiffs' fifty-three page brief attempts to explain away Doughty's various shortcomings. Here, however, it is important to remember the two key elements of our standard of review. First, having found that the district court properly applied the *Daubert* framework, we review its ultimate exclusion of Doughty's testimony only for an abuse of discretion. *Krik*, 870 F.3d at 673. That is, the question is not whether we would have admitted Doughty's testimony in the first instance; the relevant inquiry is whether any "reasonable person would agree with the decision made by the trial court" *Hunt*, 707 F.3d at 808 (quoting *Thomas*, 453 F.3d at 845). Second, it is the party that proffers expert witness testimony that bears the burden of demonstrating by a preponderance of the evidence that such testimony is sufficiently reliable. *Krik*, 870 F.3d at 673. Given the myriad issues with Doughty's testimony, the

district court was not manifestly erroneous in determining that plaintiffs failed to satisfy this burden.

2. *The Testimony of Michael Hill, Sr.*

Based upon his written report and deposition testimony, we can fairly characterize Hill's expert opinions as follows:

- (1) The fire originated on the top of the bed in the basement bedroom of plaintiffs' home;
- (2) The "most probable" cause of the fire was the laptop battery; and
- (3) The fire was accidental.

The district court's ruling can be affirmed solely by examining Hill's second opinion regarding the cause of the fire. In arriving at this conclusion, Hill proceeded by the process of elimination. After excluding the possibility that the fire was caused by the home's electrical circuitry, the ceiling light fixture located above the bed, a printer found along the bedroom's western wall, or Arun's cell phone, he came to rest upon Arun's laptop battery, which he concluded was a viable fire source. Hill stated that "[l]iterature available at the time of [his] report indicate[d that] failures of lithium ion battery cells eject molten metals and flaming electrolyte, thereby posing fire hazards." He further noted that one of the laptop's battery cells was "damaged consistent with an internal failure which would be a competent ignition source for this fire." Finally, Hill suggested that "[t]here [were] indications thermal runaway occurred within one of the lithium ion battery cells of [the] laptop, providing sufficient heat to ignite bedding materials on the bed."

During his deposition, however, Hill acknowledged that he was not an electronics or battery expert. Instead, those portions of his report that discussed the laptop batteries as a cause of the fire relied entirely upon the work of Doughty:

Q. Are you—do you have any expertise or knowledge whereby you could render an opinion regarding the appearance of a lithium-ion battery cell and whether its appearance is consistent or inconsistent with an internal failure which would be a competent ignition source?

A. No.

Q. Okay. From where did you get that statement from?

A. I believe that was ... in discussion with Mr. Doughty.

Q. Okay. So to the extent that information is in your report, that would be information you got from Mr. Doughty?

A. I believe so, yes, sir.

...

Q. There it says, the next sentence says, "There are indications thermal runaway occurred within one of the lithium-ion battery cells of a laptop, providing sufficient heat to ignite bedding materials on the bed." Do you see that?

A. Yes, sir.

Q. Where is that information from?

A. Again, Mr. Doughty.

Of course, as a general matter, there is nothing objectionable about an expert relying upon the work a colleague. See *Dura Auto. Sys. of Ind., Inc. v. CTS Corp.*, 285 F.3d 609, 613 (7th Cir. 2002) (“[I]t is common in technical fields for an expert to base an opinion in part on what a different expert believes on the basis of expert knowledge not possessed by the first expert”); see also *Carnegie Mellon Univ. v. Marvell Tech. Grp., Ltd.*, 807 F.3d 1283, 1303 (Fed. Cir. 2015) (“For areas outside her expertise ... the district court properly concluded that [the expert] could, indeed must, rely upon ... other experts having such industry-specific experience.”). Such a scenario is explicitly contemplated by the Rules of Evidence. See Fed. R. Evid. 703 (“An expert may base an opinion on facts or data in the case that the expert *has been made aware of* or personally observed.” (emphasis added)).

However, “[a]n expert is not entitled to testify to opinions that rely on the opinion of another expert, simply because the other is an expert.” *Mooring Capital Fund, LLC v. Knight*, 388 F. App’x 814, 820 (10th Cir. 2010). Under Rule 703, the facts or data relied upon must themselves be the kind that “experts in the particular field would reasonably rely on ... in forming an opinion on the subject.” Fed. R. Evid. 703. As discussed *supra*, Doughty’s own expert opinions were not sufficiently reliable to pass Rule 702 strictures. Thus, plaintiffs cannot reasonably admit through Hill what they could not offer through Doughty. As the Fifth Circuit stated in *Sims v. Kia Motors of America, Inc.*:

The district court’s order ... indicates that its exclusion [of Expert #2’s testimony] was, at least in part, due to [Expert #2’s] dependence on [Expert #1’s] theory Since the court had already

deemed [Expert #1's] testimony inadmissible, it concluded that [Expert #2's] testimony ... was also inadmissible. ... [T]he district court properly excluded [Expert #2's] theory ... because it relied on [Expert #1's] inadmissible ... theory.

839 F.3d 393, 404-05 (5th Cir. 2016); *see also* *Zimmer*, 362 F. App'x at 564 (“[B]ecause [Expert #2's] testimony on causation primarily relies on an excluded expert opinion ... , the district court did not err in excluding it.”); *Tajonera v. Black Elk Energy Offshore Operations, LLC*, No. 13-0366, 2016 WL 3180776, at *11 (E.D. La. June 7, 2016) (“[A]lthough Rule 703 undoubtedly allows experts to testify on the basis of facts or data that ‘need not be admissible’ in and of themselves, Rule 703 does not necessarily allow a witness to rely on the methodology of another expert, if that expert’s methodology would be deemed unreliable under *Daubert*.” (quoting Fed. R. Evid. 703)). As our previous analysis states, the district court did not abuse its discretion by excluding Doughty’s testimony. Thus, we find it also did not abuse its discretion when it excluded Hill’s testimony regarding the cause of the fire, as his conclusions were based on Doughty’s unreliable methodology.

Once Hill’s causation theory is precluded, his remaining opinions—regarding the fire’s place of origin and the extent to which it can be classified as “accidental”—are rendered moot. We concur with the district court’s finding that, because the “inner workings of a laptop and its components, including the battery pack and its cells, are highly technical,” expert testimony is necessary for plaintiffs to prevail on their claims. *Gopalratnam*, 2017 WL 1067768, at *3. Thus, without Doughty and Hill’s causation theories, plaintiffs cannot prove that one

of defendants' products caused the fire. Therefore, summary judgment in favor of defendants was appropriate. *See Zimmer*, 362 F. App'x at 564 ("Given that all causation testimony has been excluded, [the plaintiff's] strict liability and negligence claims necessarily fail, and summary judgment in favor of [the defendant] is appropriate.").

III. Conclusion

For the foregoing reasons, we AFFIRM the judgment of the district court.