

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

PURDUE RESEARCH FOUNDATION,

Plaintiff,

v.

GOOGLE LLC,

Defendant.

Civil Action No. 6:22-cv-00119

JURY TRIAL DEMAND

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Purdue Research Foundation files this First Amended Complaint for Patent Infringement and Jury Demand against Defendant Google LLC, as follows:

PARTIES

1. Plaintiff Purdue Research Foundation (“PRF”) is a private, nonprofit foundation created to advance the mission of Purdue University, having its principal place of business is Kurz Purdue Technology Center 1281 Win Hentschel Blvd., West Lafayette, IN 47906 in Tippecanoe County. In 1930, Purdue University’s president and its board of trustees formed and incorporated PRF for the purpose of administering and commercializing various technologies, including the technology at issue in this case, for and on behalf of Purdue University (“Purdue”). PRF is the assignee and exclusive owner of all right, title, and interest in U.S. Patent No. 10,379,925 (“925 Patent”).

2. Founded in 1869, Purdue is a public land-grant research university under the 1862 Morrill Act that is consistently ranked among the top universities in the world. Purdue enrolls more than 40,000 students under the guidance of over 16,000 faculty and staff. In September of 2020,

U.S. News & World Report ranked Purdue the fifth most innovative school in the United States. Purdue's professional and graduate programs include the well-ranked College of Engineering, Krannert School of Management, College of Education, and College of Pharmacy. Purdue's esteemed School of Aeronautics and Astronautics within the College of Engineering is known as the "Cradle of Astronauts" for producing twenty-six astronauts, including Neil Armstrong and Gus Grissom. Other notable Purdue alumni are Nobel Prize winners Edward Mills Purcell, Ben Roy Mottelson, and Akira Suzuki. Purdue has also generated twenty-four National Academy of Engineering members.

3. Purdue is one of Indiana's primary drivers for economic growth in science and technology. For example, Purdue spent over \$310 million on research during the 2020-2021 fiscal year. Purdue also ranked third nationally in startup creation and Purdue startups raised more than \$400 million in venture capital and other investor funding in the last year. In 2020, according to the National Academy of Inventors and Intellectual Property Owners Association's annual report, Purdue ranked sixth globally among universities for receiving U.S. utility patents. This distinction marks the seventh straight year that Purdue has ranked in the top twenty.

4. Defendant Google LLC ("Google") is a Delaware corporation with a physical address at 500 West 2nd Street, Austin, Texas 78701. Google may be served with process through its registered agent, the Corporation Service Company, at 211 East 7th Street, Suite 620, Austin, Texas 78701. Google is registered to do business in the State of Texas and has been since at least November 17, 2006.

5. Google makes various mobile device applications, commonly called apps, available for purchase and download through Google's Play Store—the app store for Android. Android apps

are developed using the Android Studio integrated development environment (“IDE”), which Google makes and distributes.

JURISDICTION AND VENUE

6. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the Patent Laws of the United States, 35 U.S.C. §§ 1 *et seq.*

7. This Court has personal jurisdiction over Google because it is present in and transacts and conducts business in and with the residents of this District and the State of Texas through a regional hub and at least one server in Austin, Texas.

8. Furthermore, PRF’s causes of action arise from Google’s contacts with and activities in this District and the State of Texas. Google has committed acts that infringe the asserted patents within this District and the State of Texas by making, using, selling, offering for sale, and/or importing in or into this District and elsewhere in the State of Texas infringing products. Google makes, uses, sells, offers for sale, distributes, advertises, promotes, and/or otherwise commercializes such infringing products in this District and the State of Texas. Google regularly conducts and solicits business in, engages in other persistent courses of conduct in, and/or derives substantial revenue from goods and services provided to residents of this District and the State of Texas.

9. Venue is proper in this District under 28 U.S.C. §§ 1391(b) and 1400(b) because a substantial part of the events giving rise to the claim—namely the making, using, selling, and/or offering for sale of infringing products and/or services—occurred within this District, and Google has a physical place located in the District which is a regular and established place of business belonging to Google. *See In re Cray Inc.*, 871 F.3d 1355 (Fed. Cir. 2017).

10. Google is registered to do business in the State of Texas under tax identification no. 32022652351.

11. Google maintains a regional hub in this District. Specifically, Google’s corporate office in Texas is located at 500 West 2nd Street, Austin, Texas 78701. Google actively conducts business from this regional hub in Austin, Texas—a facility which Google has spent more than \$20 million building out. This is a regular and established place of business belonging to Google.

12. Google employs software engineers and other professionals at its Austin regional hub who are likely to be material witnesses in this litigation. For example, in a 2019 article describing its continued expansion in the Western District of Texas, Google noted that it already had “more than 1,100 employees working across Android, G Suite, Google Play, Cloud, staffing and recruiting, people operations, finance and marketing.” *See* <https://blog.google/inside-google/company-announcements/texas-expansion-more-office-space-and-data-center/> (last visited February 1, 2022). Additionally, Google is actively hiring new engineers to work on Android and its ecosystem in Austin.

13. Furthermore, Google Global Cache servers are located at 3600 Presidential Boulevard, Austin, Texas 78719. Defendant’s Google Global Cache server facility is a “physical place,” a “regular and established place of business,” and a “place of [Google].” *Seven Networks, LLC v. Google LLC*, 315 F. Supp. 3d 933, 966–67 (E.D. Tex. 2018) (holding that Google Global Cache servers hosted by an internet service provider constituted a physical place within the meaning of 28 U.S.C. § 1400(b)).

THE INVENTORS

14. Y. Charlie Hu is a Michael and Katherine Birck Professor of Electrical and Computer Engineering at Purdue; he received his Master’s in Computer Science from Yale University in 1992, and his Ph.D. in Computer Science from Harvard University in 1997. Professor

Hu specializes in distributed systems, operating systems, networking, and high performance parallelized computing. He has worked extensively on smartphone energy profiling and debugging, data center networking and cloud computing, program-counter-based techniques for the I/O management in operating systems, routing, routing security, network measurement, peer-to-peer overlay networking, the synergy between peer-to-peer and grid computing, and the synergy between peer-to-peer and mobile ad hoc networking. He has published over 150 papers in these areas, including publications in ACM Transactions on Computer Systems, ACM Transactions on Mathematical Software, IEEE Transactions on Computers, ACM/IEEE Transactions on Networking, IEEE Transactions on Parallel and Distributed Systems, Journal of Parallel and Distributed Computing, IEEE JSAC, USENIX OSDI, USENIX HotOS, NSDI, EuroSys, HPCA, ACM SIGCOMM, Hotnets, ACM Sigmetrics, ACM/USENIX IMC, ACM CoNEXT, IEEE INFOCOM, and IEEE/ACM SC Conferences.

15. Abhilash Jindal was Dr. Hu's student and, under his guidance, earned his Ph.D. in Computer Science from Purdue's School of Electrical and Computer Engineering. Dr. Jindal is now an Assistant Professor in the Department of Computer Science and Engineering at the Indian Institute of Technology in Deli.

16. Samuel Midkiff is a professor in the School of Electrical and Computer Engineering at Purdue University. His research interests include abstractions for parallelism, debugging of parallel programs, compiling for low power applications, and memory models. Dr. Midkiff received a Ph.D. in computer science from the University of Illinois at Urbana-Champaign.

17. Abhinav Pathak was also Dr. Hu's student and, under his guidance, earned his Ph.D. from Purdue's School of Electrical and Computer Engineering. His work has focused

primarily on operating systems and mobile applications, particularly energy consumption tracking and modeling of component power characteristics.

THE PATENTED TECHNOLOGY

18. The present matter involves U.S. Patent No. 10,379,925, which claims systems and methods of detecting power bugs by analyzing computer code. This technology allows the detection of errors in programming which could result in impaired power management in user devices were they to go unnoticed.

19. Modern smartphones and other mobile devices have become ubiquitous over the decades and are responsible for an increasingly large share of day-to-day activities, from simple text communication or email, to complex operations like playing games or watching movies. As the range of uses for these devices has grown, their power consumption has also increased, making battery reserves the most critical resource for modern mobile devices.

20. In order to conserve battery power, modern mobile device operating systems employ aggressive power management policies which place individual components such as the screen, CPU, or device sensors in low or zero-power “sleep” modes. For example, most smartphones’ screens will turn off after a period of inactivity.

21. When programming applications for mobile operating systems which employ aggressive sleep policies, it is necessary for developers to explicitly request that components which they wish to remain active be placed in a high-power state which prevents them from sleeping. For example, a video app on a smartphone may prevent the screen from turning off while a movie is being watched. In this case, it is also incumbent upon the developer to release or deactivate the high-power state so that the device’s operating system knows that the component can safely be put to sleep to conserve battery. Failure to do so could result in a phone’s screen remaining stuck in

an awake state, draining the battery unnecessarily. This unintended behavior is known as a “power bug.”

22. In the process of developing their invention, Professor Hu and his coinventors at Purdue reverse engineered a number of publicly available mobile apps. What they discovered was that power bugs were far more widespread than initially expected; not only did they confirm a number of already-reported power bugs, they also discovered twice as many previously undetected power bugs in other apps. It was recognition of this problem which drove the development of the present invention.

23. The '925 Patent describes the application of static code analysis techniques to the problem of managing power state when developing mobile applications. By performing the claimed steps, computers are enabled to detect power bugs while code is still being written, alerting developers to their presence so that they can be resolved. Were this invention available, the numerous power bugs identified by Professor Hu and his colleagues could have been prevented before the afflicted apps were released to the public.

24. More particularly, the '925 Patent discloses analyzing code for power bugs by generating a graph structure from input code; this graph can be traversed to detect power bugs in the code being written or conversely to confirm that none are present. For example, in some embodiments of the claimed systems and methods, a depth-first search is used to traverse a control flow graph to identify code which activates power and ensure that each instance is paired with code to deactivate power regardless of which code path is executed.

25. The process of analyzing code is intrinsically complex and is impossible for human beings to perform effectively by hand for even moderately sized applications. This is because code often follows a branching pattern, in which the same application may act differently depending on

its input. As applications grow, the number of possible execution paths the computer may take becomes large enough that computational tools are required to analyze them. The '925 Patent provides these advancements through its novel analytic techniques.

26. The benefit conferred by this innovative solution is also significant. By alerting developers to errors as they write code, errors can be corrected more quickly and easily—at the time that they first occur. Further, such errors would normally be detected either by quality assurance testing or even by customer reports of excessive power use after deploying code containing power bugs. The '925 Patent provides techniques which avoid the need for lengthy testing during development, and the possible loss of user confidence that could result from consumers discovering the bugs themselves.

27. On June 25, 2012, Professor Hu publicly disclosed his patented invention during the 10th International Conference on Mobile Systems, Applications and Services and published a research paper which provided a more detailed description of this novel technique online. *See* <https://dl.acm.org/doi/10.1145/2307636.2307661/> (last visited February 1, 2022).

THE '925 PATENT

28. On August 13, 2019, U.S. Patent No. 10,379,925, titled “Systems and Methods of Detecting Power Bugs” was duly and legally issued by the USPTO. A true and correct copy of the '925 Patent is attached as Exhibit A.

29. The '925 Patent issued from U.S. Patent Application No. 15/357,473, which was filed on November 21, 2016 and claims priority to U.S. Provisional Application No. 61/839,334 filed on June 25, 2013.

30. The '925 Patent relates generally to systems and methods for detecting power bugs in code written for mobile devices.

31. PRF is the owner of all rights, title, and interest in and to the '925 Patent with full right to enforce the '925 Patent, including the right to recover for past infringement damages and the right to recover future royalties, damages, and income. On November 21, 2016, as recorded with the USPTO on January 19, 2022, the inventors assigned their rights and interests in the '925 Patent to PRF.

32. Every claim of the '925 Patent is valid and enforceable and enjoys a statutory presumption of validity pursuant to 35 U.S.C. § 282.

33. All requirements under 35 U.S.C. § 287 have been satisfied with respect to the '925 Patent.

34. Google has never, either expressly or impliedly, been licensed under the '925 Patent.

INFRINGEMENT OF THE '925 PATENT

35. Android Studio is the official integrated development environment (“IDE”) for creating Android apps. Android Lint is a software package distributed with Android Studio and for independent use. Android Lint analyzes source code by scanning for potential errors as it is being written and, when integrated with Android Studio, operates to help developers catch errors and follow best practices for app development generally.

36. Android Lint may run automatically, according to default settings of Android Studio, or alternatively may be set to run on certain conditions such as when a developer saves a file. It may also be run manually by a developer, for example from the command line/terminal. In addition to its integration with Android Studio, Android Lint is IDE independent; it can be integrated with other IDEs, build tools, and other systems, ensuring that it is used widely in the development of Android apps. For example, a developer may download Android Lint and configure their chosen IDE to run lint tests and interpret the output. Google provides instructions

for using and configuring Android Lint in its documentation. *See* <https://developer.android.com/studio/write/lint> (last visited February 1, 2022).

37. The majority of Android app developers use Android Studio. Further, even developers who do not use Android Studio nevertheless likely use Android Lint.

38. On June 13, 2012, Google engineer Angana Ghosh posted a thread to the Android-DevTools forum bringing an article previewing Professor Hu's upcoming June 25th conference presentation to the attention of other developers involved with Android Studio and Android Lint.

39. A few days later, on June 15, 2012, Google engineer Tor Norbye indicated that some of the bugs described in the preliminary article might be possible to catch using Android Lint, and resolved to try figuring out how to recognize such power bugs. He also requested contacts on the Android team who could help to familiarize him with wake locks.

40. On December 13, 2012, Norbye merged WakelockDetector.java into the Android tools base repository. WakelockDetector.java contains an infringing implementation of the present invention.

41. On information and belief, the infringing code in WakelockDetector.java was obtained directly or indirectly from disclosure later patented by Professor Hu, his coinventors, and PRF.

42. Google has been and continues to directly, indirectly by inducement, and willfully infringe one or more claims of the '925 Patent in violation of 35 U.S.C. § 271, including, but not limited, to Claim 1.

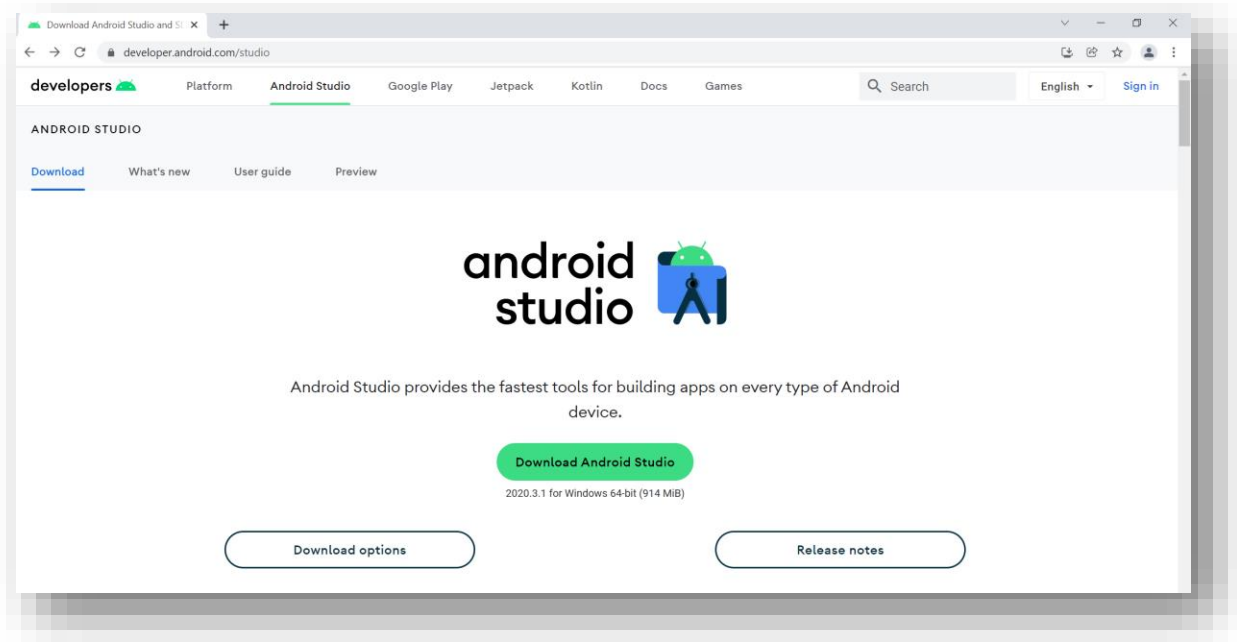
43. Google has been and continues to directly and/or indirectly infringe the '925 Patent, literally and/or under the doctrine of equivalents, by making, using, offering for sale, selling, and/or importing in or into the United States, without authority, products that fall within the scope

of one or more claims of the '925 Patent in violation of 35 U.S.C. § 271, including but not limited to Android Studio.

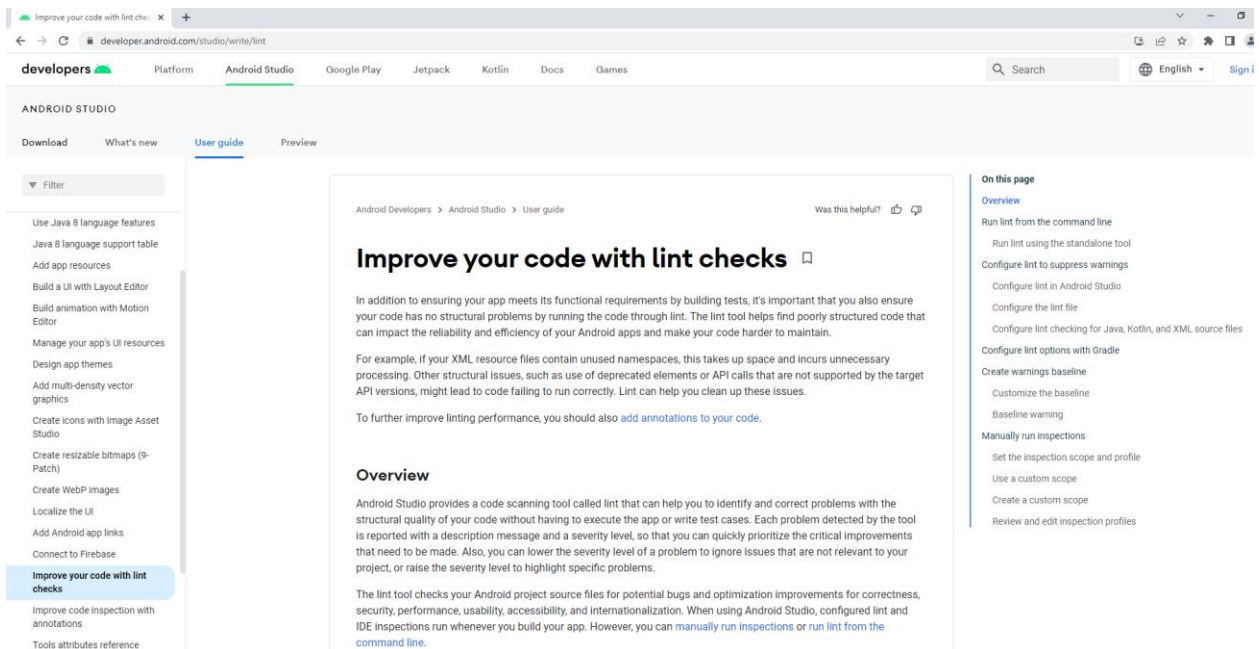
44. Google is and has been aware of this invention and its coverage of Android Studio since as early as June 2012, when Google Android engineers accessed Professor Hu's public disclosure of this invention and began incorporating it into their codebase.

45. Further, Google is and has been aware of the '925 Patent and its coverage of Android Studio since at least August 17, 2021, when PRF sent Google a notice letter of the '925 Patent and its applicability to Android Studio. Thus, as of about August 17, 2021, Google was aware that its actions as to importers, distributors, resellers, wholesalers, retailers and/or end users of the Android Studio would induce infringement.

46. Despite having been put on notice that Android Studio infringed both directly and indirectly through Android Studio, Google continues to take affirmative steps to infringe the '925 Patent, *e.g.*, by developing and disseminating Android Studio, as well as documentation, promotional and marketing materials, and/or other technical materials to distributors, resellers, wholesalers, retailers, and end-users. For example, Google directs customers to download the Android Studio application on its website, *e.g.*, at <https://developer.android.com/studio> (last visited February 1, 2022):



47. Furthermore, Google continues to induce infringement by advertizing, asking, and providing instructions to its customers to use Android Studio in an infringing manner. For example, Google advertises on its Android Studio user guide website to “improve your code with link checks” at <https://developer.android.com/studio/write/lint> (last visited April 28, 2022):



48. The Android Studio user guide asks its users to “run[] the code through lint” and provides detailed instructions on how to utilize PRF’s patented technology. The user guide also indicates that “[w]hen using Android Studio, configured lint and IDE inspections run whenever you build your app.” This shows that Google sets up Android Studio so that users automatically infringe because lint is run automatically whenever a user uses Android Studio to build applications, and therefore, demonstrates Google’s intent to induce infringement of the ’925 Patent. In addition to the automatic feature, Google also directs users to “manually run inspections or run lint from the command line.”

49. Google has continued making, using, offering for sale, selling, and/or importing the Android Studio application despite an objectively high likelihood that its actions infringe at least one claim of the ’925 Patent, and such objective risk of infringement was known to Google or so obvious that Google should have known it. Therefore, PRF is entitled to receive enhanced damages up to three times the actual damages for Google’s willful infringement pursuant to 35 U.S.C. § 284.

50. Google’s direct, indirect, and willful infringement of the ’925 Patent has caused, and will continue to cause, substantial damage to PRF. PRF is therefore entitled to an award of damages adequate to compensate for Google’s infringement of the ’925 Patent, but in no event less than a reasonable royalty for Google’s use and/or sale of PRF’s invention, together with pre- and post-judgment interest, attorneys’ fees, and costs as fixed by the Court under 35 U.S.C. §§ 284 and 285.

JURY DEMAND

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiff hereby demands a trial by jury on all issues triable as such.

PRAYER FOR RELIEF

WHEREFORE, PREMISES CONSIDERED, PRF requests that this Court enter judgment in its favor and against Defendant Google LLC as follows:

- A. Adjudging, finding, and declaring that the '925 Patent is valid and enforceable;
- B. Adjudging, finding, and declaring that Defendant has infringed at least one claim of the '925 Patent under 35 U.S.C. § 271;
- C. Awarding the past and future damages arising out of Defendant's infringement of the '925 Patent to PRF in an amount no less than a reasonable royalty, together with prejudgment and post-judgment interest, in an amount according to proof;
- D. Adjudging, finding, and declaring that Defendant's infringement is willful and awarding enhanced damages and fees in accordance with 35 U.S.C. § 284;
- E. Awarding attorney's fees, costs, or other damages pursuant to 35 U.S.C. §§ 284 or 285 or as otherwise permitted by law; and
- F. Granting PRF such other further relief as is just and proper, or as the Court deems appropriate.

Dated: April 28, 2022

Respectfully submitted,

/s/ Mark Siegmund

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***COUNSEL FOR PLAINTIFF
PURDUE RESEARCH FOUNDATION***

CERTIFICATE OF SERVICE

Pursuant to the Federal Rules of Civil Procedure and Local Rule CV-5, I hereby certify that, on April 28, 2022, all counsel of record who have appeared in this case are being served with a copy of the foregoing via the Court's CM/ECF system.

/s/ Mark D. Siegmund

Mark D. Siegmund