UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC

Petitioner

v.

MEMORYWEB, LLC

Patent Owner

Patent No. 10,621,228

Inter Partes Review No. IPR2021-01413

DECLARATION OF PROFESSOR GLENN REINMAN

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I, Glenn Reinman, declare as follows:

I. INTRODUCTION

1. I have been retained on behalf of MemoryWeb, LLC, ("MemoryWeb" or "Patent Owner") as an independent expert consultant to provide this declaration concerning the technical subject matter relevant to the *inter partes* review ("IPR") petition of U.S. Patent No. 10,621,228 ("the '228 patent") filed by Unified Patents, LLC ("Petitioner").

2. I am being compensated at my standard hourly rate of $750 per hour for the time I spend on this matter. My compensation is not related in any way to the outcome of this proceeding, and I have no other interest in this proceeding.

3. In this declaration, I offer my expert opinion regarding the technical subject matter of claims 1-7 ("the challenged claims") of the '228 patent. Specifically, I have considered whether claims 1-7 of the '228 patent are valid under 35 U.S.C. § 103. The substance and bases of my opinions appear below.

II. BACKGROUND AND QUALIFICATIONS

4. A copy of my curriculum vitae is appended hereto as Appendix A. I am currently a professor of Computer Science, serving as vice chair of the Computer Science department, at the University of California, Los Angeles (UCLA).

5. I received a Bachelor of Science degree in Computer Science and Engineering from the Massachusetts Institute of Technology (MIT) in June 1996. In

March 1999, I received a Master of Science degree in Computer Science from the University of California at San Diego. I received my Doctor of Philosophy degree in Computer Science from the University of California at San Diego in June 2001.

6. In 2001, I became an Assistant Professor at the University of California in Los Angeles (UCLA) in the Department of Computer Science. In 2007, I was promoted to the position of an Associate Professor, and in 2014, I became a Full Professor. From 2016 through 2019, I was the Graduate Vice Chair of the Computer Science department at UCLA, in charge of the Graduate Degree Program. Starting in 2021, I became the Undergraduate Vice Chair of the Computer Science department at UCLA, in charge of the Undergraduate Degree Program.

7. I teach subjects in computer science, such as computer systems architecture, microprocessor design, microprocessor simulation, distributed and parallel systems.

8. I began my career with summer internships at Intel Corporation and Compaq (now HP) in 1998 and 1999, respectively. At Intel I researched issues such as the viability of caching state from the branch predictor, the translation lookaside buffer, and the branch target buffer in the second-level data cache. I also modified SimpleScalar—a system software infrastructure used to build modeling applications for program performance analysis, microarchitectural modeling, and hardware-software co-verification—to use ITR traces for Windows applications for

predictability experiments, as well as running simulations with SimpleScalar to test the effectiveness of this technique. At Compaq, I expanded the CACTI cache compiler (CACTI 2.0), including enhancing CACTI 2.0 to include a fully associative cache model, power modeling, multiple port models, transistor tuning, and tag path balancing.

9. From 1997 through 2001, I served as a research assistant at the University of California at San Diego, where I implemented a profile-based approach to classifying loads for memory renaming, value prediction, and dependence prediction using SimpleScalar and ATOM (Analysis Tools with OM). I also created a fetch unit with a branch prediction structure called FTB, as well as working with SimpleScalar to generate a hybrid predictive technique including renaming, value prediction, address prediction, and dependence prediction.

10. Starting in 2002, I began teaching Computer Science classes at UCLA. During my time at UCLA, I have implemented a flipped classroom in my undergraduate courses, where I provide video content ahead of class with my lectures, and then use the classroom to answer questions and work through sample problems. These undergraduate courses are large, often 400 students or more in a single class. Such large classes require robust and efficient web sites to host the video content for the students, and I have spent considerable time and effort in designing and maintaining these web sites.

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