STATE OF LOUISIANA
Parish of East Baton Rouge

AFFIDAVIT

I, the undersigned Charles Neal Delzell, Professor of Mathematics, of the Department of Mathematics, 301A Lockett Hall, Louisiana State University, Baton Rouge, Lousiana 70803, being first duly sworn, do hereby state under oath and under penalty of perjury that the following facts are true:

1. I am over the age of 18 and am a resident of Louisiana. The information contained in this affidavit is based upon my own personal knowledge and, if called as a witness, I could testify competently thereto. Since 1980 I have been at Louisiana State University as an Assistant Professor, an Associate Professor, and now a full Professor, and now (since 2011) the Associate Chair for Instruction. In 1987-88 I was a Humboldt Fellow at the University of Konstanz (Germany). In 1990-91 I was a Visiting Scholar and a Visiting Associate Professor at the University of California at Berkeley. In 1998 I was a General Member of the Mathematical Sciences Research Institute at Berkeley. In 2005 I was a General Member of the Centre Emile Borel of the Institut Henri Poincaré in Paris. My first degree was a Bachelor of Arts *magna cum laude* with Honors in Mathematics at Vanderbilt University in 1974. Subsequent degrees were a Master of Science in Mathematics and a Doctor of Philosophy in Mathematics at Stanford University in 1980. My dissertation was entitled *A constructive, continuous solution to Hilbert's 17th problem, and other results in semi-algebraic geometry*. My research interests are in real algebraic geometry, sums of squares, ordered fields, and logic. With Alexander Prestel I co-authored a book entitled *Positive Polynomials: From Hilbert's 17th Problem to Real Algebraic Geometry,* published by Springer in the *Monographs in Mathematics* series in 2001, and another book entitled *Mathematical Logic and Model Theory: A Brief Introduction*, published by Springer in the Universitext series in 2011. With James J. Madden I co-edited the book *Real algebraic geometry and ordered structures – papers from the special semester (RAGOS) and AMS Special Session on Real*

Algebraic Geometry and Ordered Algebraic Structures held at Louisiana State University, Baton Rouge, LA, January-May and April 17-21, 1996, published by the American Mathematical Society in the Contemporary Mathematics series in 2000. I published a major paper entitled *Kreisel's unwinding of Artin's proof* in 1996. My other papers in the reviewed literature or in books of higher research mathematics include: *A finiteness theorem for open semialgebraic sets, with applications to Hilbert's 17th problem,* 1982; *Case distinctions are necessary for representing polynomials as sums of squares,* 1982; *Continuous sums of squares of forms,* 1982; *A continuous, constructive solution to Hilbert's 17th problem* (in *Inventiones Mathematicae*), 1984; *Analytic right-inverses for quadratic forms over number fields,* 1985; *Piecewise-rational retractions onto closed, convex semi-algebraic sets with interior – synopsis,* 1986; *Note on quantifier prefixes over Diophantine equations,* 1986, with a *Correction* thereto, 1987; *Continuous Pythagoras numbers for rational quadratic forms,* 1987; *On the Pierce-Birkhoff conjecture over ordered fields,* 1989; *A new rational and continuous solution for Hilbert's 17th problem* (with L. Gonzalez-Vega and H. Lombardi), 1992; *A continuous and rational solution to Hilbert's 17th problem, and several cases of the Positivstellensatz* (with L. Gonzalez-Vega and H. Lombardi), 1993; *Continuous sums of squares of rational functions,* (1991-92); *Continuous, piecewise-polynomial functions which solve Hilbert's 17th problem* (Journal für die reine und angewandte Mathematik), 1993; *Non-existence of analytically varying solutions to Hilbert's 17th problem,* 1994; *A completely normal spectral space that is not a real spectrum,* 1994; *Lattice-ordered rings and semialgebraic geometry: I,* 1995; *Impossibility of C-infinity variation or formal power series variation in solutions to Hilbert's 17th problem,* 2004; *Impossibility of extending Pólya's theorem to "forms" with arbitrary real exponents,* 2008; and *Extension of the two-variable Pierce-Birkhoff conjecture to generalized polynomials,* 2010. I have been the principal investigator for a conference grant from the National Security Agency's Mathematical Sciences Program, and for five research grants from the National Science Foundation.

2. I have been asked to provide expert testimony on the questions whether an affidavit sworn by The Viscount Monckton of Brenchley on November 7, 2012, which affidavit I have read, appropriately applies a probabilistic technique in mathematics to assess the probability that the image of what purports on its face to be the original paper long-form birth certificate of President Barack Hussein Obama is a true electronic representation of a genuine document; whether Monckton has deployed the technique correctly and reasonably; and whether and to what extent he is justified in his conclusion to the effect that the probability that the said document is genuine is vanishingly different from zero.

3. The probabilistic approach adopted in Monckton's affidavit is indeed fit for its purpose, and his description of it is in all respects correct. He correctly states that "Where a document contains what appear to be irregularities, they may have arisen by inadvertence or by design", and that "Probability theory assists in evaluating the likelihood that all of the irregularities were indeed inadvertent".

4. The explanation of the origin of probability theory in the analysis of games of chance that appears in Monckton's affidavit is correct, as is Monckton's statement to the effect that "the probability that a series of independent events will occur is simply the product of the individual probabilities that each of the independent events in the series will occur".

5. The relevance of this important element in the theory of probability to the examination of a suspect document apparently containing multiple irregularities is undeniable. Monckton is correct to state that where various irregularities are evident in a document and the irregularities have occurred by inadvertence they are likely to be independent of one another. It is not certain that even inadvertent irregularities will be independent of one another in all circumstances, but Lord Monckton has exercised due caution in his consideration of the question whether the irregularities to which he has assigned probabilities of less than unity are genuinely independent of one another.

6. Monckton's technique depends upon the reliability of the findings of the team of forensic experts whom the law-enforcement investigators consulted. However, he has properly made explicit the fact that his analysis is contingent upon their findings. He has additionally demonstrated appropriate caution in not concurring with all of the experts' findings and accordingly in not assigning probabilities below unity to any findings that he considered questionable.

7. I have not examined any of the evidence myself and have not previously had any connection with or first-hand knowledge of the results of the law enforcement investigation: nevertheless, the individual probabilities that Monckton has assigned to each of the irregularities found by the investigators and not disputed by him appear on their face to be reasonable.

8. In case the probabilities Monckton has assigned to any or all of the individual irregularities that he has listed might be called into question, he has carried out a separate calculation of the overall probability that the document is genuine under the assumption that each of the irregularities to which he has assigned probabilities might have occurred inadvertently as much as half the time. It seems very unlikely that any of the irregularities specified in Monckton's list of probabilities could possibly have occurred by inadvertence as often as this. Accordingly, Monckton's conclusion that, even under this extreme scenario, the probability that the main document and three associated records are all genuine is 1 in 65,000 overstates that probability by a very great but not precisely quantifiable margin. Always provided that the investigators' results are sound, the probability that the documentation that they have scrutinized is genuine is indeed vanishingly different from zero.

9. For these reasons, and subject only to the fact that I have not verified the forensic investigators' results, Monckton's conclusion, based on those results, that the relevant documentation is near-certainly forged necessarily follows, mathematically speaking.

10. Monckton's affidavit says that the method he has used and the results that flow from it "are explicit, transparent, and independent of any expertise or prejudice on the part of the mathematician", and that "They may be independently reviewed by any other mathematician." I have never met Monckton or Mr Obama or any of those investigating the documentation. I can confirm, therefore, that my own examination of Monckton's affidavit is genuinely independent. Monckton's presentation of his method is indeed explicit; it is, therefore, capable of being independently reviewed by any sufficiently qualified and genuinely independent mathematician; and any such mathematician would be compelled to agree with the conclusions I have drawn here and, therefore, with Monckton's principal conclusion.

Executed this 12th day of November 2012,
in East Baton Rouge Parish, Louisiana.

Charles N. Delzell

Charles Neal Delzell

Sworn to and subscribed before me
this 12th *day of* November *2012*

Soula O'Bannon

Soula I. O'Bannon, Notary Public
East Baton Rouge Parish
State Of Louisiana
My Commission is for life.
I. D. 39009

LSU College of Science

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