CV and Research Statement

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1 At a Glance

- **Focus.** *Identification of security problems, trends and solution along four axes – computational, structural, physical and social; quantitative and qualitative fraud analysis; development of disruptive security technologies.*

- **Education.** *PhD* (Computer Science/Cryptography, University of California at San Diego, 1997); *MSc* (Computer Science, University of California at San Diego, 1994); *MSc* (Computer Engineering, Lund Institute of Technology, Sweden, 1993).

- **Large research labs.** *San Diego Supercomputer Center* (Researcher, 1996-1997); *Bell Labs* (Member of Technical Staff, 1997-2001); *RSA Labs* (Principal Research Scientist, 2001-2004); *Xerox PARC* (Principal Scientist, 2008-2010); PayPal (Principal Scientist of Consumer Security, Director, 2010-2013); Qualcomm (Senior Director, 2013-2015); Agari (Chief Scientist, 2016–2018); Amber Solutions Inc (Chief of Security and Data Analytics, 2018 – 2019); ByteDance (Principal Scientist, 2020-2021)

- **Academia.** *New York University* (Adjunct Associate Professor, 2002-2004); *Indiana University* (Associate Professor & Associate Director, 2004-2008; Adjunct Associate Professor, 2008-2016).

- **Entrepreneurial activity.** *ZapFraud* (Anti-scam technology; CTO and founder, 2012-current); *RavenWhite Security* (Authentication solutions; CTO and founder, 2005-); *RightQuestion* (Consulting; Founder, 2007-current); *FatSkunk* (Malware detection; CTO and founder, 2009-2013 – FatSkunk was acquired by Qualcomm); *LifeLock* (Id theft protection; Member of fraud advisory board, 2009-2013); *CellFony* (Mobile security; Member of technical advisory board, 2009-2013); *PopGiro* (User Reputation; Member of technical advisory board, 2012-2013); *MobiSocial* (Social networking, Member of technical advisory board, 2013); *Cequence Security* (Anti-fraud, Member of technical advisory board, 2013–current)

- **Anti-fraud consulting.** *KommuneData* [Danish govt. entity] (1996); *J.P. Morgan Chase* (2006-2007); *PayPal* (2007-2011); *Boku* (2009-2010); *Western Union* (2009-2010).

- **Intellectual Property, Testifying Expert Witness.** *Inventor of 100+ patents; expert witness in 25+ patent litigation cases* (McDermott, Will & Emery; Bereskin & Parr; WilmerHale; Hunton & Williams; Quinn Emanuel Urquhart & Sullivan; Freed & Weiss; Berry & Domer; Fish & Richardson; DLA Piper; Cipher Law Group; Keker & Van Nest). Details and references upon request.

- **Publications**. Books: *Phishing and Countermeasures: Understanding the Increasing Problem of Electronic Identity Theft* (Wiley, 2006); *Crimeware: Understanding New Attacks and Defenses* (Symantec Press, 2008); *Towards Trustworthy Elections: New Directions in Electronic Voting* (Springer Verlag, 2010); *Mobile Authentication: Problems and Solutions*)Springer Verlag, 2012); *The Death of the Internet* (Wiley, 2012); *Understanding Social Engineering* (Springer Verlag, 2016); *Security, Privacy and User Interaction* (Springer Verlag, 2020); *100+ peer-reviewed publications*

2   At a Glance

Ten years before Bitcoin was created, I formalized the notion of Proof of Work and described its use for mining of crypto payments. I later developed energy-efficient alternatives to this paradigm, and showed how to enable mining on mobile devices, which is not possible for Bitcoin. I am the founder of the academic discipline of phishing and have developed techniques to predict fraud trends years before they emerge, enabling countermeasures to be developed before they are needed. I developed the notion of implicit authentication, which is now ubiquitous; I also founded a company that developed the first retroactive virus detection technology, with guarantees of detection; the company was acquired by Qualcomm in 2013. I have worked as chief scientist and similar positions in startups as well as industry behemoths, such as PayPal. I have several hundred patents to my name and am a prominent security researcher with hundreds of peer reviewed publications and an array of textbooks. My 1997 PhD thesis, from University of California at San Diego, was on distributed electronic payment systems with revocable privacy.

3   Work History (Highlights)

1. **Member of Technical Staff, Bell Labs (1997-2001).** Markus was part of the security research group at Bell Labs. He formalized the notion of *proof of work*, later an integral part of BitCoin.

2. **Principal Scientist, RSA Labs (2001-2005).** Markus posited that phishing would become a mainstream problem, and developed ethical techniques for identifying likely trends based on human subject experiments.

3. **Associate Professor, Indiana University (2005-2008).** Markus was hired to lead the newly formed security group at Indiana University, and

created a research group comprising approximately 10 professors and 30 students, studying social engineering and fraud.

4. **Principal Scientist, Xerox PARC (2008-2010).** Markus was hired to lead the research efforts of the Xerox PARC security group, and developed the notion of *implicit authentication*, a technology that is now ubiquitous.

5. **Principal Scientist, PayPal (2010-2013).** Markus did research on security and user interfaces, and developed techniques to reduce the losses associated with *liar buyer fraud.*

6. **Senior Director, Qualcomm (2013-2016).** Qualcomm acquires FatSkunk, a company founded by Markus. At FatSkunk, Markus developed *retroactive* malware detection with provable security guarantees. A simplified version of this is now deployed with almost all Qualcomm chipsets.

7. **Chief Scientist, Agari (2016-2018).** Markus developed a technique to acquire fraudster intelligence by compromising scammer email accounts – *while staying within the law* – resulting in the extradition of several African scam lords to the U.S.

8. **Chief of Security and Data Analytics, Amber Solutions (2018-2020).** Markus developed usable configuration methods supporting improved security and privacy for IoT installations.

9. **Chief Scientist, ByteDance (2020-2021).** Markus oversaw the establishment of a research group and a research agenda at ByteDance, and contributed to their intellectual property and product security.

4   Publication List

Books (1-8); book chapters, journals, conference publications and other scientific publications (9-147), issued /published U.S. patents (148-234). For an updated list, and for international patents, please see `www.markus-jakobsson.com/publications` and appropriate patent search engines.

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[3] M. Jakobsson, *Mobile Authentication: Problems and Solutions*, ISBN 1461448778, 125 pages, Springer, 2013.

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