

# DR. FRANK BREITINGER

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*\*Confidentiality with regards to present employer is requested\**

## EDUCATION

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**PhD - Computer Sciences** March 2011 - June 2014  
*Technical University Darmstadt*

- Emphasis on Cyber Forensics and Cybersecurity.
- Member of da/sec - biometrics and internet-security research group.
- Member of Center for Advanced Security Research Darmstadt (CASED).

**MSc. - Computer Sciences** March 2009 - February 2011  
*University of Applied Sciences Darmstadt*

- Emphasis on Cyber Forensics and Cybersecurity.

**BSc. - Computer Sciences** October 2005 - February 2009  
*University of Applied Sciences Mannheim*

- Emphasis on Software Development.
- Practical semester at the University of Maryland (USA). Sept. 2007 to Mar. 2008.
- Thesis at sobedi GmbH Mannheim with a focus on software development. Aug. 2008 to Feb. 2009.

## WORK EXPERIENCE

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**University of Liechtenstein** Juni 2019 - present  
*Assistant Professor, Hilti Chair for Data and Application Security* Vaduz

- Developing and teaching multiple course in cybersecurity and digital forensics.

**University of New Haven** September 2014 - August 2019  
*Assistant Professor (Tenure Track),*  
*Co-Director of the Cyber Forensics Research and Education Laboratory* West Haven, CT

- Developing and teaching multiple course in cybersecurity and digital forensics.
- Applying to various research funding agencies.
- Member of the Faculty Senate and engineering LLC advisor.
- Started developing the PhD in Engineering / Applied Sciences.
- Student recruitment during open houses, accepted students days and other events.

**University of Applied Sciences Darmstadt** March 2011 - March 2014  
*Research Assistant* Darmstadt, Germany

- Research in cybersecurity and digital forensics.
- Teaching and supporting classes cybersecurity.
- Sponsored by the FIDELITY Grant - Working on the indexing problem of similarity digests (a.k.a. fingerprints) for the European passport.

**National Institute of Standards and Technology (NIST)** Oct. 2013 - Dec. 2013  
*Visiting Researcher* Gaithersburg, MD, USA

- Developed Special Publication 800-168 named Approximate Matching: Definition and Terminology.

**IT-fuer-jedermann.de**

*Self-Employed*

September 2009 - August 2014

*Beerfelden, Germany*

- Security assessment and maintenance of the IT-Infrastructure for companies.
- Webdesign, Internet/Network, Consultation, Education and Sale.
- Designed an implemented several web pages based on Wordpress and PHP.

## **DEVELOPMENT AND OTHER ACTIVITIES\***

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1. 2017: **Research Fellowship** (two weeks) at Brno university of technology with the **NES@FIT** - Networked and embedded systems research group. Supported researchers on various projects as well as gave presentations.
2. 2017: Helped organizing the **National Workshop on Redefining Cyber Forensics (NWRCF)**, two days) in Hartford (CT) which was NSF sponsored. A blue-ribbon panel to stimulate the needed intellectual exchange of ideas and discussions on the future of cyber forensics.
3. 2016: **Master Teacher Seminar** (two days) with Dr. Harvey Brightman, sponsored by the College of Business at the University of New Haven.
4. 2016: **KEEN ICE Workshop** (three days) featuring activities and presentations covering the important aspects of Entrepreneurially Minded Learning (EML), Active and Collaborative Learning (ACL), and Problem/Project Based Learning (PBL) and how to integrate them into your own courses. Details [here](#).

\*Some selected activities.

## **AWARDS & HONORS**

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1. 2018: Best Paper Award: If I Had a Million Cryptos: Cryptowallet Application Analysis and A Trojan Proof-of-Concept at the International Conference on Digital Forensics and Cyber Crime, New Orleans.
2. 2018: Student hacking team received Forth place in the northeast qualifiers of the Collegiate Penetration Testing Competition (CPTC) at the University of Pennsylvania.
3. 2017: University Research Scholar – (the scholar receives a partial teaching workload release for 3 academic years + a modest budget).
4. 2017: Best Paper award for the paper: Expediting MRSH-v2 Approximate Matching with Hierarchical Bloom Filter Trees at the International Conference on Digital Forensics and Cyber Crime, Prague, CZ.
5. 2017: Student hacking team received Second place at CyberSEED, University of Connecticut.
6. 2017: Student hacking team received Third place in the northeast qualifiers of the Collegiate Penetration Testing Competition (CPTC) at the University of Pennsylvania.
7. 2016: Merit Award – University of New Haven (in recognition of individual strong performance, and support of students in experiential education opportunities, as well as to acknowledge the overall contribution).
8. 2015: **FBTI Award of Excellence** – Fachbereichstag Informatik for my dissertation in Computer Science at a German Universities of Applied Science.
9. 2015: Best Paper award for the paper: How Cuckoo Filter Can Improve Existing Approximate Matching Techniques at the International Conference on Digital Forensics and Cyber Crime, Seoul, Korea.

10. 2015: Siew-Sngiem Best Poster Award: Towards Bloom Filter-based Indexing of Iris Biometric Data at the International Conference on Biometrics, Phuket, Thailand.
11. 2014: Best paper award for the paper: File Detection On Network Traffic Using Approximate Matching at the International Conference on Digital Forensics and Cyber Crime, New Haven, CT.
12. 2013: Best paper award for the paper: Evaluating Detection Error Trade-offs for Byte-wise Approximate Matching Algorithms at the International Conference on Digital Forensics and Cyber Crime, Moscow, Russia.

## FUNDING

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1. 2019: Source NSA / NSF, Title: University of New Haven's Cyber Agent in Charge (Teacher camp), PI: Frank Breitingner, Co-PIs: Ibrahim Baggili, Liberty Page, Amount: \$89,000 – funded.
2. 2018: Source: University of New Haven, Title: Cryptowallet Application Analysis, PI: Frank Breitingner, Amount: \$3,250 – funded.
3. 2018: Source NSA / NSF, Title: University of New Haven's Cyber Agent Academy (Student camp), PI: Ibrahim Baggili, Co-PIs: Frank Breitingner, Liberty Page, Amount: \$64,099 – funded.
4. 2017: Source: Davis Educational Foundation, Title: Development of the 'CyberWorld' Common Course at the University of New Haven, PI: Frank Breitingner, Co-PIs: Kristen Przyborski, Ronald Harichandran, Ibrahim Baggili, Guy-Serge Emmanuel, Glenn McGee Amount \$103,125 (\$167,418 including cost sharing) – funded.
5. 2017: Source: NSF, Title: Exploring cybersecurity & forensics of Virtual Reality systems and their impact on cybersecurity education, PI: Ibrahim Baggili, Co-PI: Frank Breitingner, Amount \$179,409 – funded.
6. 2017: Source: University of New Haven, Title: Availability of Datasets for digital forensics - and what is missing, PI: Frank Breitingner, Amount: \$3,250 – funded.
7. 2017: Source NSA / NSF, Title: University of New Haven's Cyber Agent Academy (Student camp), PI: Ibrahim Baggili, Co-PIs: Frank Breitingner, Liberty Page, Amount: \$53,029 – funded.
8. 2016: Source: NSF, Title: National Workshop on Redefining Cyber Forensics (NWRFCF), PI: Ibrahim Baggili, Co-PI: Frank Breitingner, Amount: \$49,995 – funded.
9. 2016: Source: University of New Haven, Title: A survey to enhance adult education in cyber security, PI: Frank Breitingner, Amount: \$3,250 – funded.
10. 2014: Source: Purdue University sub-award through Department of Homeland Security, Title: Artifact Genome Project, PI: Ibrahim Baggili, Co-PIs: Frank Breitingner, Ted Markowitz, Amount: \$140,000 – funded.

## PUBLICATIONS & PRESENTATIONS

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### Books

1. Frank Breitingner and Ibrahim Baggili, eds. *Digital Forensics and Cyber Crime: 10th International EAI Conference, ICDF2C 2018, New Orleans, LA, USA, September 10–12, 2018, Proceedings*. Vol. 259. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Springer International Publishing, 2019. ISBN: 978-3-030-05486-1.
2. Joshua I. James and Frank Breitingner, eds. *Digital Forensics and Cyber Crime: 7th International Conference, ICDF2C 2015, Seoul, South Korea, October 6-8, 2015, Revised Selected Papers*. Vol. 157. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Springer, 2015. ISBN: 978-3-319-25511-8.

## Book Chapters

1. Joseph Ricci, Ibrahim Baggili, and Frank Breitinger. “Watch What You Wear: Smartwatches and Sluggish Security”. In: *Managing Security Issues and the Hidden Dangers of Wearable Technologies*. Ed. by Andrew Marrington, Don Kerr, and John Gammack. IGI Global, 2016, p. 47.

## Journal Articles (peer-reviewed)

1. Mark Debinski, Frank Breitinger, and Parvathy Mohan. “Timeline2GUI: A Log2Timeline CSV parser and training scenarios”. *Digital Investigation* 28 (2019), pp. 34–43. ISSN: 1742-2876.
2. Lorenz Liebler, Patrick Schmitt, Harald Baier, and Frank Breitinger. “On Efficiency of Artifact Lookup Strategies in Digital Forensics”. *Digital Investigation* (2019). (Accepted for publication).
3. Joseph Ricci, Ibrahim Baggili, and Frank Breitinger. “Blockchain-Based Distributed Cloud Storage Digital Forensics: Where’s the Beef?” *IEEE Security & Privacy* 17.1 (2019), pp. 34–42. ISSN: 1540-7993.
4. Cinthya Grajeda, Laura Sanchez, Ibrahim Baggili, Devon Clark, and Frank Breitinger. “Experience constructing the Artifact Genome Project (AGP): Managing the domain’s knowledge one artifact at a time”. *Digital Investigation* 26 (2018), S47–S58. ISSN: 1742-2876.
5. Joseph Ricci, Frank Breitinger, and Ibrahim Baggili. “Survey results on adults and cybersecurity education”. *Education and Information Technologies* (July 2018), pp. 1–19. ISSN: 1360-2357.
6. Devon R. Clark, Christopher Meffert, Ibrahim Baggili, and Frank Breitinger. “DROP (DRone Open source Parser) your drone: Forensic analysis of the DJI Phantom III”. *Digital Investigation* 22, Supplement (2017), S3–S14. ISSN: 1742-2876.
7. George Denton, Filip Karpisek, Frank Breitinger, and Ibrahim Baggili. “Leveraging the SRTP protocol for over-the-network memory acquisition of a GE Fanuc Series 90-30”. *Digital Investigation* 22, Supplement (2017), S26–S38. ISSN: 1742-2876.
8. Cinthya Grajeda, Frank Breitinger, and Ibrahim Baggili. “Availability of datasets for digital forensics – And what is missing”. *Digital Investigation* 22, Supplement (2017), S94–S105. ISSN: 1742-2876.
9. Jason Moore, Ibrahim Baggili, and Frank Breitinger. “Find Me If You Can: Mobile GPS Mapping Applications Forensics Analysis & SNAVP The Open Source, Modular, Extensible Parser”. *Journal of Digital Forensics, Security and Law (JDFSL)* 12.1 (2017), p. 7.
10. Xiaolu Zhang, Ibrahim Baggili, and Frank Breitinger. “Breaking into the vault: privacy, security and forensic analysis of android vault applications”. *Computers & Security* 70 (2017), pp. 516–531. ISSN: 0167-4048.
11. Samer Al-khateeb, Kevin J. Conlan, Nitin Agarwal, Ibrahim Baggili, and Frank Breitinger. “Exploring Deviant Hacker Networks (DHN) On Social Media Platforms”. *Journal of Digital Forensics, Security and Law* 11.2 (2016), pp. 7–20.
12. Kevin Conlan, Ibrahim Baggili, and Frank Breitinger. “Anti-forensics: Furthering digital forensic science through a new extended, granular taxonomy”. *Digital Investigation* 18 (2016), pp. 66–75. ISSN: 1742-2876.
13. Vikram S. Harichandran, Frank Breitinger, and Ibrahim Baggili. “Bytewise Approximate Matching: The Good, The Bad, and The Unknown”. *Journal of Digital Forensics, Security and Law* 11.2 (2016), pp. 59–78.
14. Vikram S. Harichandran, Frank Breitinger, Ibrahim Baggili, and Andrew Marrington. “A cyber forensics needs analysis survey: Revisiting the domain’s needs a decade later”. *Computers & Security* 57 (2016), pp. 1–13. ISSN: 0167-4048.

15. Vikram S. Harichandran, Daniel Walnycky, Ibrahim Baggili, and Frank Breitinger. “CuFA: A more formal definition for digital forensic artifacts”. *Digital Investigation* 18 (2016), pp. 125–137. ISSN: 1742-2876.
16. Doowon Jeong, Frank Breitinger, Hari Kang, and Sangjin Lee. “Towards Syntactic Approximate Matching-A Pre-Processing Experiment”. *The Journal of Digital Forensics, Security and Law: JDFSL* 11.2 (2016), pp. 97–110.
17. Christopher S. Meffert, Ibrahim Baggili, and Frank Breitinger. “Deleting collected digital evidence by exploiting a widely adopted hardware write blocker”. *Digital Investigation* 18 (2016), pp. 87–96. ISSN: 1742-2876.
18. Xiaolu Zhang, Frank Breitinger, and Ibrahim Baggili. “Rapid Android Parser for Investigating DEX files (RAPID)”. *Digital Investigation* 17 (2016), pp. 28–39. ISSN: 1742-2876.
19. Filip Karpisek, Ibrahim Baggili, and Frank Breitinger. “WhatsApp network forensics: Decrypting and understanding the WhatsApp call signaling messages”. *Digital Investigation* 15 (2015), pp. 110–118. ISSN: 1742-2876.
20. Daniel Walnycky, Ibrahim Baggili, Andrew Marrington, Jason Moore, and Frank Breitinger. “Network and device forensic analysis of Android social-messaging applications”. *Digital Investigation* 14, Supplement 1 (2015). The Proceedings of the Fifteenth Annual DFRWS Conference, pp. 77–84. ISSN: 1742-2876.
21. Frank Breitinger and Ibrahim Baggili. “File Detection On Network Traffic Using Approximate Matching”. *Journal of Digital Forensics, Security and Law (JDFSL)* 9.2 (2014), pp. 23–36.
22. Frank Breitinger, Harald Baier, and Douglas White. “On the database lookup problem of approximate matching”. *Digital Investigation* 11, Supplement 1.0 (2014). Proceedings of the First Annual DFRWS Europe, S1–S9. ISSN: 1742-2876.
23. Frank Breitinger, Christian Rathgeb, and Harald Baier. “An Efficient Similarity Digests Database Lookup - A Logarithmic Divide & Conquer Approach”. *Journal of Digital Forensics, Security and Law (JDFSL)* 9.2 (2014), pp. 155–166.
24. Frank Breitinger and Vassil Roussev. “Automated evaluation of approximate matching algorithms on real data”. *Digital Investigation* 11, Supplement 1.0 (2014). Proceedings of the First Annual DFRWS Europe, S10 –S17. ISSN: 1742-2876.
25. Frank Breitinger, Georgios Stivaktakis, and Vassil Roussev. “Evaluating Detection Error Trade-offs for Byte-wise Approximate Matching Algorithms”. *Digital Investigation* 11.2 (2014), pp. 81–89. ISSN: 1742-2876.
26. Christian Rathgeb, Frank Breitinger, Christoph Busch, and Harald Baier. “On application of bloom filters to iris biometrics”. *Biometrics, IET* 3.4 (2014), pp. 207–218. ISSN: 2047-4938.
27. Frank Breitinger, Georgios Stivaktakis, and Harald Baier. “FRASH: A Framework to Test Algorithms of Similarity Hashing”. *Digit. Investig.* 10 (2013), S50–S58. ISSN: 1742-2876.

#### **Conference Proceedings (peer-reviewed)**

1. Trevor Haigh, Frank Breitinger, and Ibrahim Baggili. “If I Had a Million Cryptos: Cryptowallet Application Analysis and a Trojan Proof-of-Concept”. In: *Digital Forensics and Cyber Crime*. Ed. by Frank Breitinger and Ibrahim Baggili. Cham: Springer International Publishing, 2019, pp. 45–65. ISBN: 978-3-030-05487-8.

2. Robert Schmicker, Frank Breitingner, and Ibrahim Baggili. “AndroParse - An Android Feature Extraction Framework and Dataset”. In: *Digital Forensics and Cyber Crime*. Ed. by Frank Breitingner and Ibrahim Baggili. Cham: Springer International Publishing, 2019, pp. 66–88. ISBN: 978-3-030-05487-8.
3. Brandon Knieriem, Xiaolu Zhang, Philip Levine, Frank Breitingner, and Ibrahim Baggili. “An Overview of the Usage of Default Passwords”. In: *Digital Forensics and Cyber Crime*. Ed. by Petr Matoušek and Martin Schmiedecker. Cham: Springer International Publishing, 2018, pp. 195–203. ISBN: 978-3-319-73697-6.
4. Lorenz Liebler and Frank Breitingner. “mrsh-mem: Approximate Matching on Raw Memory Dumps”. In: *2018 11th International Conference on IT Security Incident Management IT Forensics (IMF)*. 2018, pp. 47–64.
5. David Lillis, Frank Breitingner, and Mark Scanlon. “Expediting MRSH-v2 Approximate Matching with Hierarchical Bloom Filter Trees”. In: *Digital Forensics and Cyber Crime*. Ed. by Petr Matoušek and Martin Schmiedecker. Cham: Springer International Publishing, 2018, pp. 144–157. ISBN: 978-3-319-73697-6.
6. Laoise Luciano, Ibrahim Baggili, Mateusz Topor, Peter Casey, and Frank Breitingner. “Digital Forensics in the Next Five Years”. In: *Proceedings of the 13th International Conference on Availability, Reliability and Security*. ARES 2018. Hamburg, Germany: ACM, 2018, 46:1–46:14. ISBN: 978-1-4503-6448-5.
7. Christopher Meffert, Devon Clark, Ibrahim Baggili, and Frank Breitingner. “Forensic State Acquisition from Internet of Things (FSAIoT): A General Framework and Practical Approach for IoT Forensics Through IoT Device State Acquisition”. In: *Proceedings of the 12th International Conference on Availability, Reliability and Security*. ARES '17. Reggio Calabria, Italy: ACM, 2017, 56:1–56:11. ISBN: 978-1-4503-5257-4.
8. Ibrahim Baggili and Frank Breitingner. “Data Sources for Advancing Cyber Forensics: What the Social World Has to Offer”. In: *AAAI Spring Symposium Series*. 2015.
9. Ibrahim Baggili, Jeff Oduru, Kyle Anthony, Frank Breitingner, and Glenn McGee. “Watch What You Wear: Preliminary Forensic Analysis of Smart Watches”. In: *Availability, Reliability and Security (ARES), 2015 10th International Conference on*. 2015, pp. 303–311.
10. Vikas Gupta and Frank Breitingner. “How Cuckoo Filter Can Improve Existing Approximate Matching Techniques”. English. In: *Digital Forensics and Cyber Crime*. Ed. by Joshua I. James and Frank Breitingner. Vol. 157. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. **Best Paper Award**. Springer International Publishing, 2015, pp. 39–52. ISBN: 978-3-319-25511-8.
11. Christian Rathgeb, Frank Breitingner, Harald Baier, and Christoph Busch. “Towards Bloom filter-based indexing of iris biometric data”. In: *Biometrics (ICB), 2015 International Conference on*. **Siew-Sngiem Best Poster Award**. 2015, pp. 422–429.
12. Gurjar Satyendra, Ibrahim Baggili, Frank Breitingner, and Alice Fischer. “An empirical comparison of widely adopted hash functions in digital forensics: does the programming language and operating system make a difference?” In: *Proceedings of the Conference on Digital Forensics, Security and Law*. 2015, pp. 57–68.
13. Frank Breitingner, Christian Winter, York Yannikos, Tobias Fink, and Michael Seefried. “Using Approximate Matching to Reduce the Volume of Digital Data”. English. In: *Advances in Digital Forensics X*. Ed. by Gilbert Peterson and Sujeet Sheno. Vol. 433. IFIP Advances in Information and Communication Technology. Springer Berlin Heidelberg, 2014, pp. 149–163. ISBN: 978-3-662-44951-6.

14. Frank Breitinger, Georg Ziroff, Steffen Lange, and Harald Baier. "Similarity Hashing Based on Levenshtein Distances". English. In: *Advances in Digital Forensics X*. Ed. by Gilbert Peterson and Sujeet Sheno. Vol. 433. IFIP Advances in Information and Communication Technology. Springer Berlin Heidelberg, 2014, pp. 133–147. ISBN: 978-3-662-44951-6.
15. Frank Breitinger et al. "Towards a Process Model for Hash Functions in Digital Forensics". English. In: *Digital Forensics and Cyber Crime*. Ed. by Pavel Gladyshev, Andrew Marrington, and Ibrahim Baggili. Vol. 132. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Springer International Publishing, 2014, pp. 170–186. ISBN: 978-3-319-14288-3.
16. Frank Breitinger, Knut Astebøl, Harald Baier, and Christoph Busch. "mvHash-B - A New Approach for Similarity Preserving Hashing". In: *IT Security Incident Management and IT Forensics (IMF), 2013 Seventh International Conference on*. 2013, pp. 33–44.
17. Frank Breitinger and Harald Baier. "Similarity Preserving Hashing: Eligible Properties and a New Algorithm MRSB-v2". English. In: *Digital Forensics and Cyber Crime*. Ed. by Marcus Rogers and Kathryn C. Seigfried-Spellar. Vol. 114. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Springer Berlin Heidelberg, 2013, pp. 167–182. ISBN: 978-3-642-39890-2.
18. Frank Breitinger and Kaloyan Petrov. "Reducing the Time Required for Hashing Operations". English. In: *Advances in Digital Forensics IX*. Ed. by Gilbert Peterson and Sujeet Sheno. Vol. 410. IFIP Advances in Information and Communication Technology. Springer Berlin Heidelberg, 2013, pp. 101–117. ISBN: 978-3-642-41147-2.
19. Christian Rathgeb, Frank Breitinger, and Christoph Busch. "Alignment-free cancelable iris biometric templates based on adaptive bloom filters". In: *Biometrics (ICB), 2013 International Conference on*. 2013, pp. 1–8.
20. Frank Breitinger and Harald Baier. "A fuzzy hashing approach based on random sequences and hamming distance". In: *Proceedings of the Conference on Digital Forensics, Security and Law*. 2012, pp. 89–100.
21. Frank Breitinger and Harald Baier. "Performance Issues About Context-Triggered Piecewise Hashing". English. In: *Digital Forensics and Cyber Crime*. Ed. by Pavel Gladyshev and Marcus K. Rogers. Vol. 88. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Springer Berlin Heidelberg, 2012, pp. 141–155. ISBN: 978-3-642-35514-1.
22. Frank Breitinger and Harald Baier. "Properties of a similarity preserving hash function and their realization in sdhash". In: *Information Security for South Africa (ISSA)*. 2012, pp. 1–8.
23. Frank Breitinger, Harald Baier, and Jesse Beckingham. "Security and implementation analysis of the similarity digest sdhash". In: *First International Baltic Conference on Network Security & Forensics (NeSeFo)*. 2012.
24. Harald Baier and Frank Breitinger. "Security Aspects of Piecewise Hashing in Computer Forensics". In: *IT Security Incident Management and IT Forensics (IMF), 2011 Sixth International Conference on*. 2011, pp. 21–36.
25. Frank Breitinger and Claudia Nickel. "User Survey on Phone Security and Usage". In: *BIOSIG*. Ed. by Arslan Brömme and Christoph Busch. Vol. 164. LNI. GI, 2010, pp. 139–144. ISBN: 978-3-88579-258-1.

## Other major Publications

1. Frank Breitinger. "On the utility of bitwise approximate matching in computer science with a special focus on digital forensics investigations". PhD thesis. Technical University Darmstadt, 2014.
2. Frank Breitinger, Barbara Guttman, Michael McCarrin, Vassil Roussev, and Douglas White. *Approximate Matching: Definition and Terminology*. Special Publication 800-168. National Institute of Standards and Technologies, 2014.
3. Frank Breitinger. "Security Aspects of fuzzy hashing". MA thesis. University of Applied Sciences Darmstadt, 2011.

### Workshops, Presentations and Invited Talks

\*This section does not include conference presentations.

1. Trevor Haigh and Frank Breitinger. *Android Forensics and Reverse Engineering*. Workshop at the Digital Forensics Research Conference (DFRWS). Providence, Rhode Island. July 2018.
2. Frank Breitinger. *State-of-the-art in Cyber Forensics: Now & Tomorrow*. Presentation at KAIST. Daejeon, South Korea. 2017.
3. Frank Breitinger and Ibrahim Baggili. *Five Presentations including IoT, Drones, Similarity matching, mobile applications and PLCs*. National Training on Crime Scene Management in cases of terrorism related offences organized by **United Nations Office on Drugs and Crime (UNODC)**. Amman, Jordan. 2017.
4. Frank Breitinger. *Reducing data for forensic investigations using approximate matching*. Presentation at University New Haven. 2014.
5. Frank Breitinger. *Similarity Preserving Hashing*. Presentation at 8. GI SIG SIDAR Graduate Workshop on Reactive Security (SPRING). 2013.
6. Barbara Guttman, Frank Breitinger, Simson Garfinkel, Jesse Kornblum, and Clay Shields. *Approximate Matching of Digital Artifacts*. Panel discussion at 13th Digital Forensics Research Conference (DFRWS13). Monterey, California. 2013.
7. Frank Breitinger. *Similarity Preserving Hashing*. Presentation at CAST Workshop - Forensik und Internetkriminalitaet. Darmstadt, Germany. 2012.
8. Frank Breitinger and Harald Baier. *Security Aspects of Piecewise Hashing in Computer Forensics*. Abstract and Presentation at 6. GI SIG SIDAR Graduate Workshop on Reactive Security (SPRING). 2011.

### UNIVERSITY SERVICE

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#### University of New Haven

- 09/2018 - 05/2019: Advisor for the Engineering Living Learning Community (LLC).
- 08/2017 - 05/2019: Member of the Academic Committee on Student Life.
- 05/2016 - 05/2019: Member of the University of New Haven Faculty Senate.

### PROFESSIONAL / PUBLIC SERVICE

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#### Advisory Committee Members

- 11/2017 - 07/2018: Member of the Advisory Committee for Project Lead the Way (PLTW) Cybersecurity.

#### Board Member

- 2016 - today: Digital Investigation (DI).



- 2014 - today: Journal of Digital Forensics, Security and Law (JDFSL).

### **General Co-Chair**

- 2016: International Conference on Digital Forensics & Cyber Crime, Manhattan (NY), United States.

### **Technical Program Chair**

- 2018: 10th International Conference on Digital Forensics & Cyber Crime, New Orleans (LA), US.
- 2015: 7th International Conference on Digital Forensics & Cyber Crime, Seoul, South Korea.
- 2014: 6th International Conference on Digital Forensics & Cyber Crime, New Haven (CT), US.

### **Program Committee Member**

Current:

- 2015 - today: International Conference on Availability, Reliability and (ARES) (Workshop WSDF).
- 2015 - today: Systematic Approaches to Digital Forensic Engineering (SADFE).
- 2014 - today: Digital Forensics Research Conference (DFRWS).
- 2014 - today: Digital Forensics Research Conference Europe (DFRWS EU).
- 2014 - today: International Conference on Digital Forensics (IFIP WG 11.9).
- 2013 - today: International Conference on Digital Forensics & Cyber Crime (ICDF2C).

Past:

- 2015 - 2017: Conference on Digital Forensics, Security and Law (ADFSL).

### **Reviewer for Articles in**

- 2019: IEEE Access - The Multidisciplinary Open Access Journal.
- 2018: IEEE Transactions on Dependable and Secure Computing.
- 2018: Computers & Security.
- 2018: Journal of Forensic Sciences.
- 2017: IEEE Security & Privacy (magazine).
- 2017: IEEE Transactions on Information Forensics and Security.
- 2017: Indian Journal of Science and Technology.
- 2017: Journal of Information Security and Applications.
- 2017: Information Systems.
- 2016: ACM Computing Surveys.
- 2015: Digital Investigation.
- 2015: Journal of Information Technology.

## **TEACHING EXPERIENCES**

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### **University of New Haven**

- Introduction to Network Security (graduate & undergraduate).
- Introduction to Scripting / Python (graduate & undergraduate).
- Reverse Engineering (Android / ARM) (graduate & undergraduate).
- Ethical Hacking (graduate & undergraduate).
- Topics in Cyber Security and Forensics (graduate & undergraduate).
- Introduction to Computer Security (graduate & undergraduate).
- Software Project Analysis and Design (graduate & undergraduate).
- Object oriented Design and Analysis (graduate & undergraduate).
- Senior Software Project (undergraduate).
- Life on Earth - CyberWorld (undergraduate (freshman)).

## University of Applied Sciences Darmstadt

- Selected Topics of IT-Security (graduate).
- IT-security seminar on Internet Security and Similarity Hashing (graduate).
- Theory-Seminar about Aspects of Fuzzy Hashing\* (graduate) - Teaching assistant.
- Cryptography\* (graduate) - Teaching assistant.
- Computer Forensics\* (graduate) - Teaching assistant.

\*I am more than comfortable with the material and could teach these courses without a long preparation time.

### Additional

- Contributed to a 'letter of study' for an online lecture in *digital forensic*. 5 ECTS lecture for Master students including a practical (German).

## STUDENTS ADVISING / HOSTED

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Note, this section does not list any internships, senior design projects, independent studies or projects.

### Master thesis

- 2017: Vikram Harichandran - Approximate matching for Template detection.
- 2016: Lorenz Liebler - Approximate matching for malware detection in memory.
- 2015: Tobias Huppertz - Indexing similarity hashes using Bloom filters.
- 2013: Vikas Gupta - File fragment detection on network traffic using similarity hashing.
- 2013: Simon Thurner - Methods for identification of encryption data and its application in digital forensics.
- 2012: Tim Völpel - Forensic-Chatlog-Parser.
- 2012: Knut Petter Åstebøl - mvHash - a new approach for fuzzy hashing.
- 2012: Jesse Beckingham - Security analysis of sdhash.

### Bachelor thesis

- 2012: Dario Cundari - Software tools for testing similarity preserving algorithms.
- 2012: Georg Ziroff - Approaches for similarity-preserving hashing.

### Hosted guests

- 2019: Vitor Moia; University of Campinas, São Paulo, Brazil; research on PhD thesis (3 months).
- 2018: Patrick Schmitt; Technical University Darmstadt; research on master thesis (1 month).
- 2017: Dr. David Lillis; University College Dublin; research on a **Fulbright scholarship** (1 month).
- 2016: Lorenz Liebler; University of Applied Science Darmstadt; research on master thesis (1.5 month).

### Hacking Team

- 2015-2018: Supervising `hack@UNHcFREG`
  - Some success: 3 times finalist for Collegiate Penetration Testing Competition (CPTC) Nationals; 2nd place at CyberSeed 201 (price money \$7,500); tied for 1st in TAMUCTF 2017.

## MEDIA CONTRIBUTIONS

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Note, this is not a complete list but some selected contributions.

### Television

- FOX61: Staying save during Christmas shopping (Live on Good morning Connecticut) (Dec. 8, 2017).
- WTNH - News8: Keeping your kids safe on social media (Aug. 8, 2017).

- WTNH - News8: Social Media Security: Beware the urge to “over-share” (Feb. 6, 2017).
- WTNH - News8: Study: Banks have weak password handling (Mar. 1, 2016).
- FOX-CT: FBI director: Apple encryption dispute “hardest question” seen in government (Feb. 25, 2016).
- CBS Chicago: Is Your Smartwatch Safe From Hackers? (Feb. 9, 2016).
- WTNH - News8: Facebook threat sends schools named ‘Lincoln’ on high alert, including Meriden (Jan. 26, 2016).
- WTNH - News8: Things you should NOT buy online (Dec. 16, 2015).
- WTNH - News8: How to protect your identity from being stolen this holiday season (Dec. 2, 2015).
- WTNH - News8: Experts reveal how ISIS is using the dark web to stay undetected (Nov. 19, 2015).
- Local10: Researchers on smartwatch concerns (Dec. 16, 2015).
- Local10: Watch what you wear: Smartwatches vulnerable to attack (Aug. 3, 2015).
- FOX-CT: Thinking like ‘bad guys’ to protect the interwebs (Jun. 30, 2015).

### **Internet / Magazines**

- PR Newswire and picked up by several others: University of New Haven Hacking Team Competes Nationally After Winning Regional, Connecticut Competitions (Oct. 31, 2017).
- Hartford Courant: From Manchester Office, Digital Police Detectives Track Down Child-Porn Viewers (continued: Massachusetts Man Faces Glastonbury Voyeurism Charges (Oct. 13, 2016)).
- Bulletin of the Academy of Science and Engineering: Cybersecurity: Implications and Prevention What Can We Learn from the NIST Framework? (Sept. 1, 2016).
- Digital Guardian: Insider vs. Outsider Data Security Threats: What’s the Greater Risk? (Jul. 26, 2016).
- Company Dime: Sabre’s Silence On Security ‘Incident’ Isn’t Unusual, But It’s Still Making Travel Managers Nervous (Sept. 3, 2015).
- CNET: Samsung, LG smartwatches give up personal data to researchers (Jun. 10, 2015).

### **MORE INFORMATION**

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More information and auxiliary documents can be found at

- <http://www.FBreitinger.de>
- <https://www.linkedin.com/pub/frank-breitinger/87/65/496>
- <http://www.unhcfreg.com>